

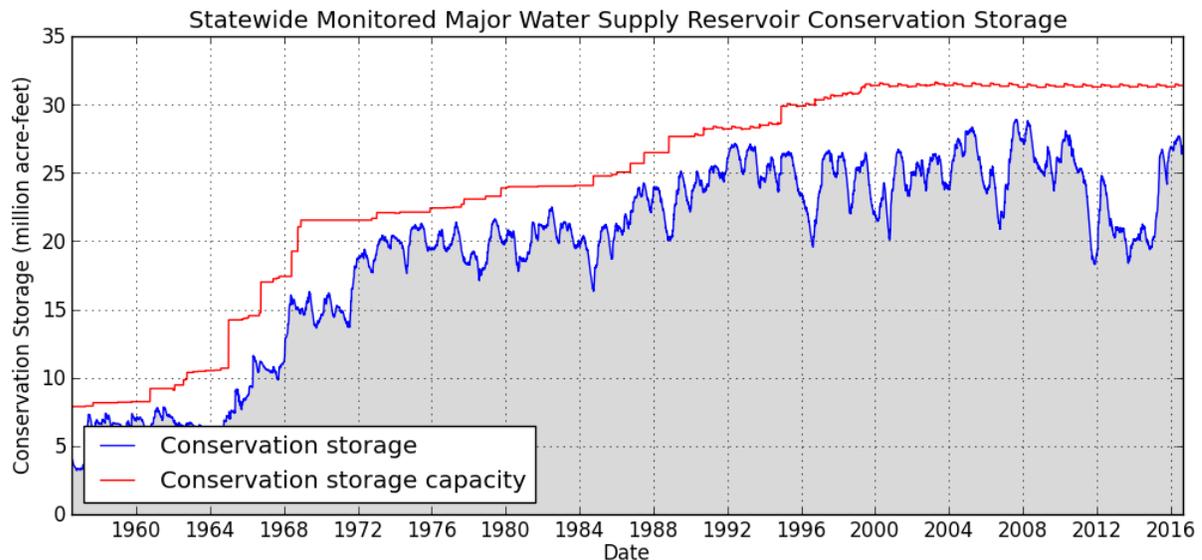
## *AUGUST 2016 RESERVOIR STORAGE\**

At the end of the month, total conservation storage in 114 of the state's major water supply reservoirs was at 26.98 million acre-feet or 86% of total conservation storage capacity. This is approximately 0.06 million acre-feet more than a month ago and 1.18 million acre-feet more than the storage at this time last year.

Thirty-seven (37) reservoirs held 100% of conservation storage capacity, primarily in the North Central (24) and East (8) regions. Two (2) reservoirs remained below 10% full: Palo Duro (3%) and Twin Buttes (9%).

Total combined storage was at or above normal (storage  $\geq$  70%) in the North Central (97%), South Central (100%), East (97%), Upper Coast (100%), Trans-Pecos (85%), and Low Rolling Plains (74%) regions. The region with the lowest percentage of storage was the High Plains (22%) region. Overall, storage increased in five regions but declined in four regions over the past month.

Elephant Butte reservoir held 133,532 acre-feet or 7% of storage capacity. This is 57,881 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 August 2016		Change since end of July 2016		Change since end of August 2015	
		(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
<b>HIGH PLAINS</b>							
Palo Duro Reservoir	61,066	1,652	3	112	0	-185	-0
Meredith, Lake (Texas)	500,000	123,102	25	-4,250	-1	17,506	4
Meredith, Lake (Texas & Oklahoma)	779,556	123,102	16	-4,250	-1	17,506	2
MacKenzie Reservoir	46,450	7,141	15	69	0	-628	-1
White River Lake	29,880	7,991	27	-397	-1	-2,597	-9
<b>TOTAL</b>	<b>637,396</b>	<b>139,886</b>	<b>22</b>	<b>-4,466</b>	<b>-1</b>	<b>14,096</b>	<b>2</b>
<b>LOW ROLLING PLAINS</b>							
Greenbelt Lake	59,968	16,500	28	1,516	3	3,463	6
N. Fork Buffalo Crk Reservoir	15,400	11,548	75	-637	-4	-14	-0
Kemp, Lake	245,307	221,452	90	-15,814	-6	28,725	12
Millers Creek Reservoir	26,768	24,075	90	-709	-3	-1,237	-5
Alan Henry Reservoir	94,808	85,734	90	-1,523	-2	-6,867	-7
Stamford, Lake	51,570	46,122	89	-1,531	-3	-905	-2
J B Thomas, Lake	199,931	127,045	64	-3,057	-2	-25,474	-13
Fort Phantom Hill, Lake	70,030	66,374	95	-1,215	-2	21,631	31
Sweetwater, Lake	12,267	2,678	22	-87	-1	1,211	10
Colorado City, Lake	30,758	7,374	24	-309	-1	-2,003	-7
Champion Creek Reservoir	41,580	10,261	25	-303	-1	4,499	11
Abilene, Lake	7,900	7,847	99	530	7	7,581	96
Coleman, Lake	38,075	35,837	94	-765	-2	8,907	23
Hords Creek Lake	8,443	7,380	87	-220	-3	4,043	48
<b>TOTAL</b>	<b>902,805</b>	<b>670,227</b>	<b>74</b>	<b>-24,124</b>	<b>-3</b>	<b>43,560</b>	<b>5</b>
<b>NORTH CENTRAL</b>							
Nocona, Lake (Farmers Crk)	21,444	20,096	94	-603	-3	-432	-2
Hubert H Moss Lake	24,058	22,174	92	-1,229	-5	-795	-3
Texoma, Lake (Texas)	1,258,113	1,224,906	97	-33,207	-3	-33,207	-3
Texoma, Lake (Texas & Oklahoma)	2,525,281	1,224,906	49	-33,207	-1	-33,207	-1
*Pat Mayse Lake	113,683	109,097	96	-1,725	-2	no data	
Kickapoo, Lake	86,345	82,925	96	58	0	1,255	1
Arrowhead, Lake	230,359	210,281	91	-5,132	-2	-13,033	-6
Bonham, Lake	11,027	9,256	84	-422	-4	-78	-1
Crook, Lake	9,195	8,325	91	-154	-2	325	4
Amon G Carter, Lake	19,266	19,266	100	0	0	289	2
Ray Roberts, Lake	788,167	788,167	100	284	0	0	0
Jim Chapman Lake (Cooper)	260,332	236,728	91	-9,991	-4	-4,883	-2
Graham, Lake	45,288	45,288	100	2,680	6	3,492	8
*Lost Creek Reservoir	11,950	11,887	99	168	1	164	1
Bridgeport, Lake	366,236	366,236	100	0	0	21,546	6
Lewisville Lake	563,228	563,228	100	0	0	0	0
Lavon Lake	406,388	368,854	91	-17,934	-4	-4,011	-1
Hubbard Creek Reservoir	318,067	297,005	93	-1,575	-0	188,175	59
Possum Kingdom Lake	523,873	522,404	100	4,721	1	4,721	1
*Mineral Wells, Lake	6,760	6,760	100	163	2	279	4
Weatherford, Lake	17,812	17,725	100	1,181	7	2,249	13
Eagle Mountain Lake	179,880	179,880	100	1,462	1	11,759	7
Worth, Lake	33,495	33,495	100	2,870	9	4,257	13
Grapevine Lake	164,703	164,703	100	0	0	0	0
Ray Hubbard, Lake	452,040	436,565	97	-3,907	-1	15,134	3
New Terrell City Lake	8,583	8,385	98	-34	-0	290	3
Palo Pinto, Lake	26,766	25,361	95	-884	-3	1,048	4
Benbrook Lake	85,648	82,208	96	-782	-1	9,942	12
Arlington, Lake	40,188	32,458	81	-2,756	-7	1,646	4

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

Name of Lake or Reservoir	Conservation Storage Capacity (acre-feet)	Conservation Storage end of August 2016		Change since end of July 2016		Change since end of August 2015	
		(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
<i>(North Central continued)</i>							
Joe Pool Lake	175,358	171,742	98	-2,435	-1	-3,616	-2
*Cisco, Lake	25,895	25,895	100	0	0	7,605	29
Leon, Lake	27,762	24,665	89	-1,014	-4	-282	-1
Granbury, Lake	125,756	125,756	100	76	0	0	0
Pat Cleburne, Lake	26,008	24,137	93	-953	-4	1,199	5
Waxahachie, Lake	10,780	10,684	99	160	1	1,606	15
Bardwell Lake	46,122	46,122	100	657	1	937	2
Proctor Lake	54,762	51,531	94	-2,679	-5	-3,231	-6
Whitney, Lake	553,344	509,716	92	-10,526	-2	-14,656	-3
Aquilla Lake	43,243	43,243	100	0	0	3,500	8
Navarro Mills Lake	49,827	49,827	100	0	0	1,542	3
*Halbert, Lake	6,033	5,312	88	49	1	335	6
Richland-Chambers Reservoir	1,087,839	1,087,839	100	9,830	1	9,404	1
*Brownwood, Lake	128,839	122,662	95	-2,403	-2	252	0
Waco, Lake	189,418	189,418	100	648	0	10,137	5
Limestone, Lake	203,780	197,009	97	4,376	2	17,005	8
Belton Lake	435,225	435,225	100	0	0	0	0
Stillhouse Hollow Lake	227,771	227,771	100	0	0	3,845	2
Georgetown, Lake	36,823	36,823	100	231	1	6,199	17
Granger Lake	51,822	51,822	100	0	0	0	0
Tawakoni, Lake	871,685	829,499	95	-27,844	-3	-14,032	-2
Mountain Creek, Lake	22,850	22,850	100	0	0	23	0
Squaw Creek, Lake	151,250	151,250	100	0	0	0	0
<b>TOTAL</b>	<b>10,625,086</b>	<b>10,334,461</b>	<b>97</b>	<b>-98,575</b>	<b>-1</b>	<b>237,904</b>	<b>2</b>
<b>EAST</b>							
Wright Patman Lake	231,496	231,496	100	0	0	0	0
*Sulphur Springs, Lake	17,747	16,380	92	-619	-3	760	4
Cypress Springs, Lake	66,756	63,908	96	948	1	1,293	2
Bob Sandlin, Lake	190,822	186,866	98	1,364	1	no data	
Caddo, Lake	29,898	29,898	100	0	0	0	0
Martin, Lake	75,726	72,448	96	2,961	4	3,291	4
Monticello, Lake	34,740	34,740	100	0	0	468	1
Fork Reservoir, Lake	605,061	569,950	94	-4,296	-1	-4,042	-1
O the Pines, Lake	268,566	268,566	100	0	0	2,787	1
Cedar Creek Reservoir in Trinity	644,686	621,747	96	4,773	1	15,827	2
Athens, Lake	29,503	28,573	97	-126	-0	867	3
Palestine, Lake	367,303	348,652	95	-1,794	-0	4,457	1
Tyler, Lake	72,073	68,147	95	317	0	2,107	3
Murvaul, Lake	38,285	36,752	96	975	3	1,907	5
Jacksonville, Lake	25,670	25,670	100	335	1	1,213	5
Nacogdoches, Lake	39,522	39,151	99	2,678	7	3,554	9
Houston County Lake	17,113	17,113	100	767	4	1,432	8
Sam Rayburn Reservoir	2,857,077	2,765,277	97	-21,167	-1	-53,618	-2
Toledo Bend Reservoir (Texas)	2,236,450	2,095,782	94	-60,340	-3	53,252	2
Toledo Bend Reservoir (TX & LA)	4,472,900	2,095,782	47	-60,340	-1	53,252	1
*Livingston, Lake	1,785,348	1,785,348	100	0	0	0	0
B A Steinhagen Lake	66,961	63,416	95	-1,762	-3	-1,034	-2
Conroe, Lake	410,988	410,988	100	10,103	2	21,369	5
<b>TOTAL</b>	<b>10,111,791</b>	<b>9,780,868</b>	<b>97</b>	<b>-64,883</b>	<b>-1</b>	<b>55,890</b>	<b>1</b>
<b>TRANS-PECOS</b>							
Red Bluff Reservoir	151,110	129,099	85	6,422	4	20,288	13
<b>TOTAL</b>	<b>151,110</b>	<b>129,099</b>	<b>85</b>	<b>6,422</b>	<b>4</b>	<b>20,288</b>	<b>13</b>

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS							
Name of Lake or Reservoir	Conservation Storage Capacity (acre-feet)	Conservation Storage end of August 2016		Change since end of July 2016		Change since end of August 2015	
		(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
<b>EDWARDS PLATEAU</b>							
Oak Creek Reservoir	39,210	18,870	48	517	1	8,259	21
E V Spence Reservoir	517,272	49,609	10	-1,726	-0	11,419	2
O C Fisher Lake	115,742	15,811	14	-903	-1	3,010	3
*O H Ivie Reservoir	554,340	118,689	21	-5,676	-1	36,431	7
Twin Buttes Reservoir	182,454	16,524	9	-946	-1	5,149	3
Nas worthy	9,615	8,048	84	-258	-3	-135	-1
Brady Creek Reservoir	28,808	14,182	49	-436	-2	4,396	15
Buchanan, Lake	816,904	811,266	99	866	0	224,190	27
Inks, Lake	13,962	12,877	92	-98	-1	-173	-1
Lyndon B Johnson, Lake	115,249	110,636	96	487	0	122	0
*Amistad Reservoir (Texas)	1,840,849	1,466,747	80	95,804	5	314,375	17
*Amistad Reservoir (TX & Mexico)	3,275,532	1,466,747	45	95,804	3	314,375	10
<b>TOTAL</b>	<b>4,234,405</b>	<b>2,643,259</b>	<b>62</b>	<b>87,631</b>	<b>2</b>	<b>607,043</b>	<b>14</b>
<b>SOUTH CENTRAL</b>							
Travis, Lake	1,113,348	1,113,348	100	37,005	3	226,096	20
*Austin, Lake	23,972	22,696	95	46	0	-76	-0
Somerville Lake	147,104	147,104	100	0	0	0	0
Canyon Lake	378,781	378,781	100	0	0	8,503	2
Medina Lake	254,823	251,679	99	-663	-0	69,927	27
*Coletto Creek Reservoir	31,040	28,671	92	-329	-1	no data	
<b>TOTAL</b>	<b>1,949,068</b>	<b>1,942,279</b>	<b>100</b>	<b>36,059</b>	<b>2</b>	<b>304,450</b>	<b>16</b>
<b>UPPER COAST</b>							
Houston, Lake	120,686	120,686	100	0	0	0	0
Texana, Lake	159,566	159,382	100	8,431	5	15,424	10
<b>TOTAL</b>	<b>280,252</b>	<b>280,068</b>	<b>100</b>	<b>8,431</b>	<b>3</b>	<b>15,424</b>	<b>6</b>
<b>SOUTHERN</b>							
Choke Canyon Reservoir	695,262	304,194	44	74,542	11	66,596	10
Corpus Christi, Lake	256,961	211,292	82	51,108	20	-18,887	-7
*Falcon Reservoir (Texas)	1,551,007	540,811	35	-9,162	-1	-165,375	-11
*Falcon Reservoir (TX & Mexico)	2,646,817	540,811	20	-9,162	-0	-165,375	-6
<b>TOTAL</b>	<b>2,503,230</b>	<b>1,056,297</b>	<b>42</b>	<b>116,488</b>	<b>5</b>	<b>-117,666</b>	<b>-5</b>
<b>STATEWIDE TOTAL</b>							
<b>STATEWIDE TOTAL</b>	<b>31,395,143</b>	<b>26,976,444</b>	<b>86</b>	<b>62,983</b>	<b>0</b>	<b>1,180,989</b>	<b>4</b>
Elephant Butte Reservoir	1,973,358	133,532	7	-57,881	-3	-53,039	-3

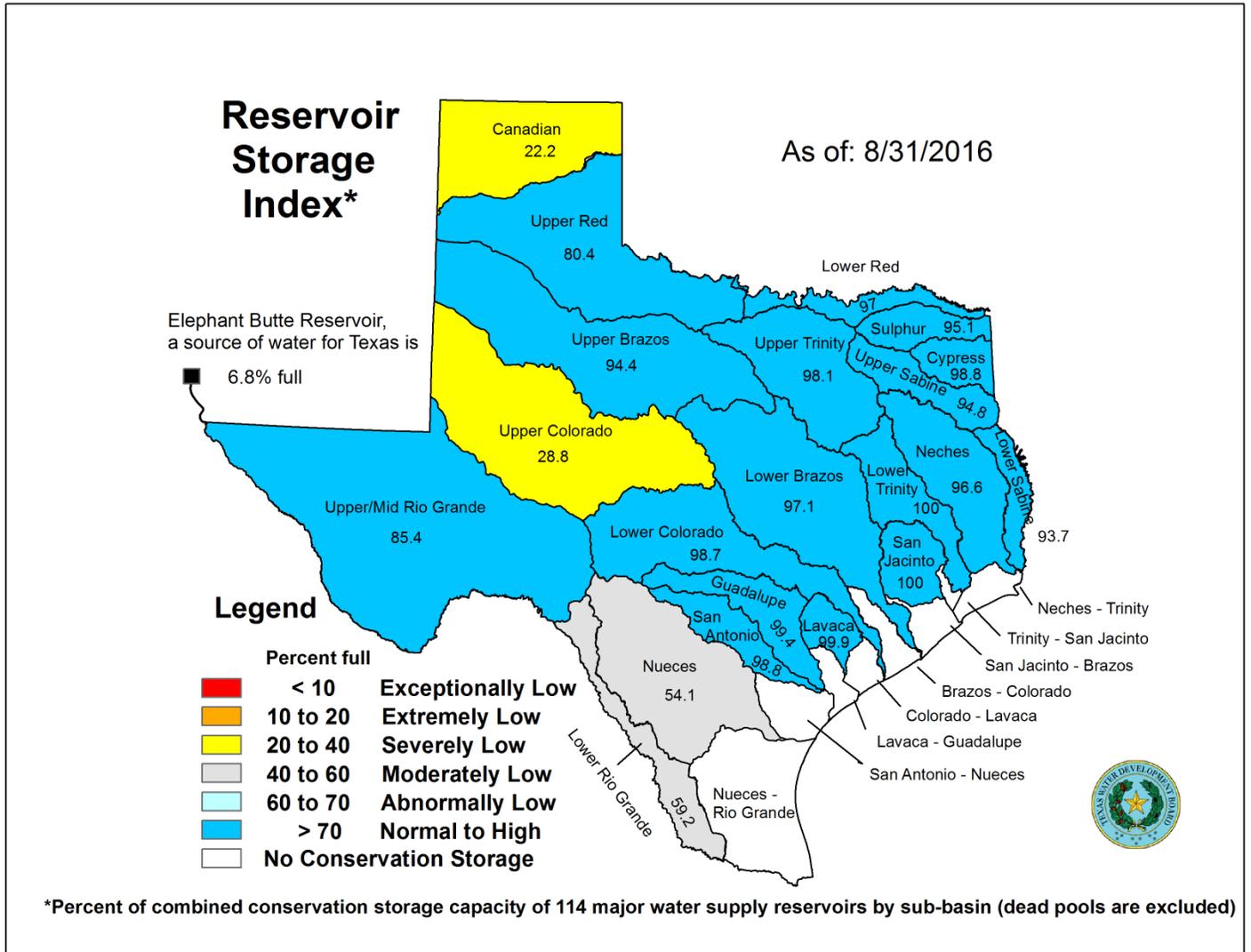
\* Conservation volume is used as conservation storage capacity because the dead storage is unknown.

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

# AUGUST 2016 RESERVOIR CONDITIONS



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

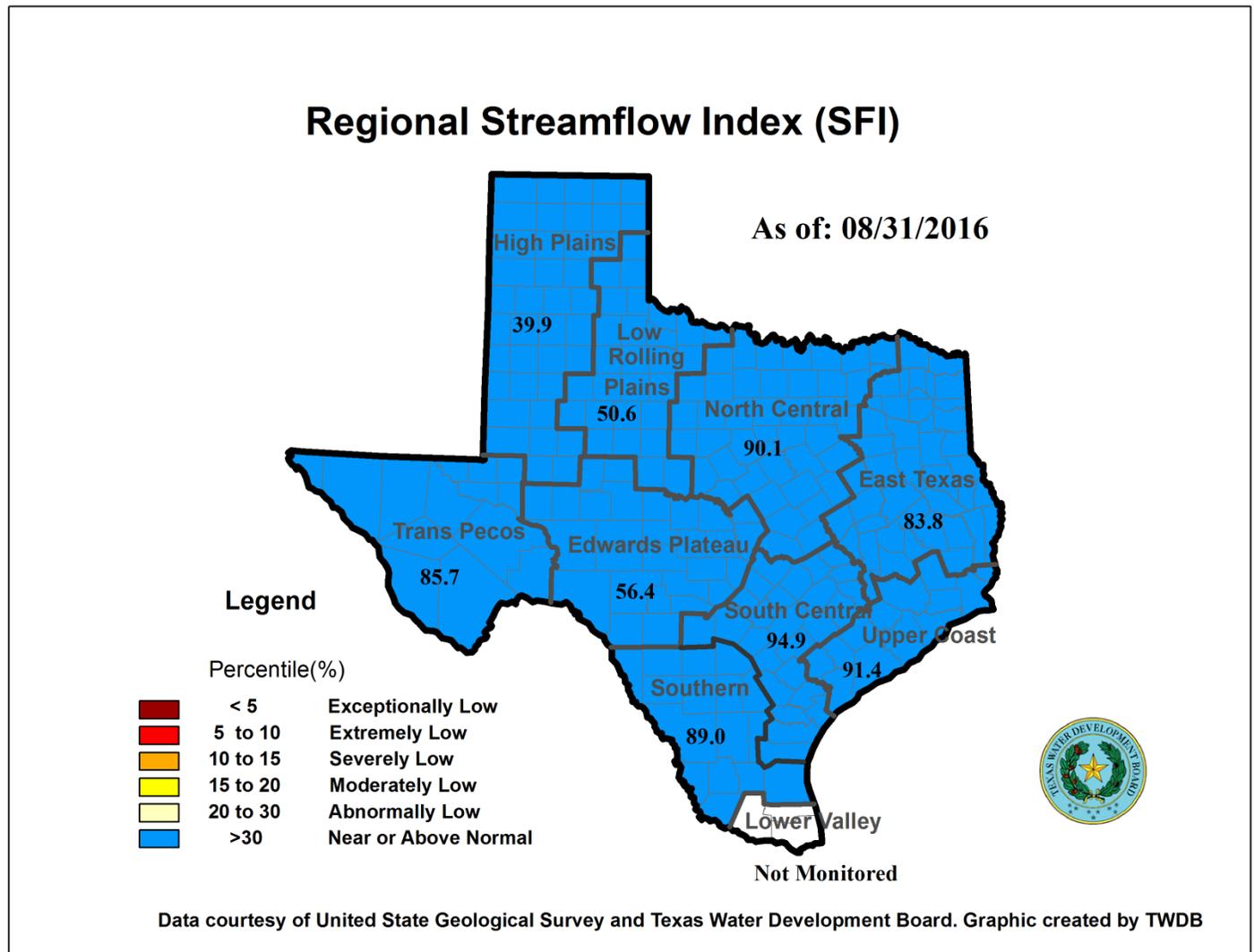
\*Reservoir Storage Index is defined as the percent full of conservation storage capacity.

## AUGUST 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 22 index stations, decreased at six (6) stations, and remained unchanged at one (1) station.

Streamflow Status	Number of Stations
Near or Above Normal (>30%)	26
Abnormally Low (20-30%)	1
Moderately Low (15-20%)	1
Severely Low (10-15%)	0
Extremely Low (5-10%)	1
Exceptionally Low (<5%)	0

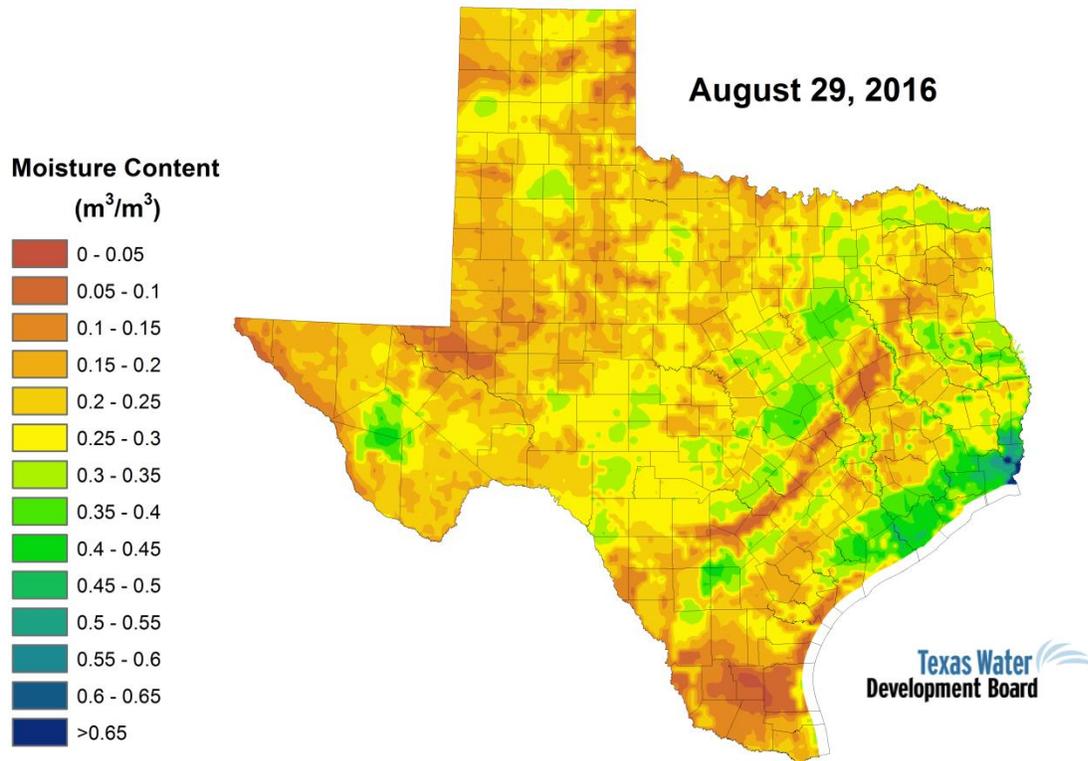
On a regional basis, as shown below, flows at index stations were near or above normal in all nine regions. Streamflow in the Lower Valley region is not monitored.



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

# AUGUST 2016 SOIL MOISTURE CONDITIONS

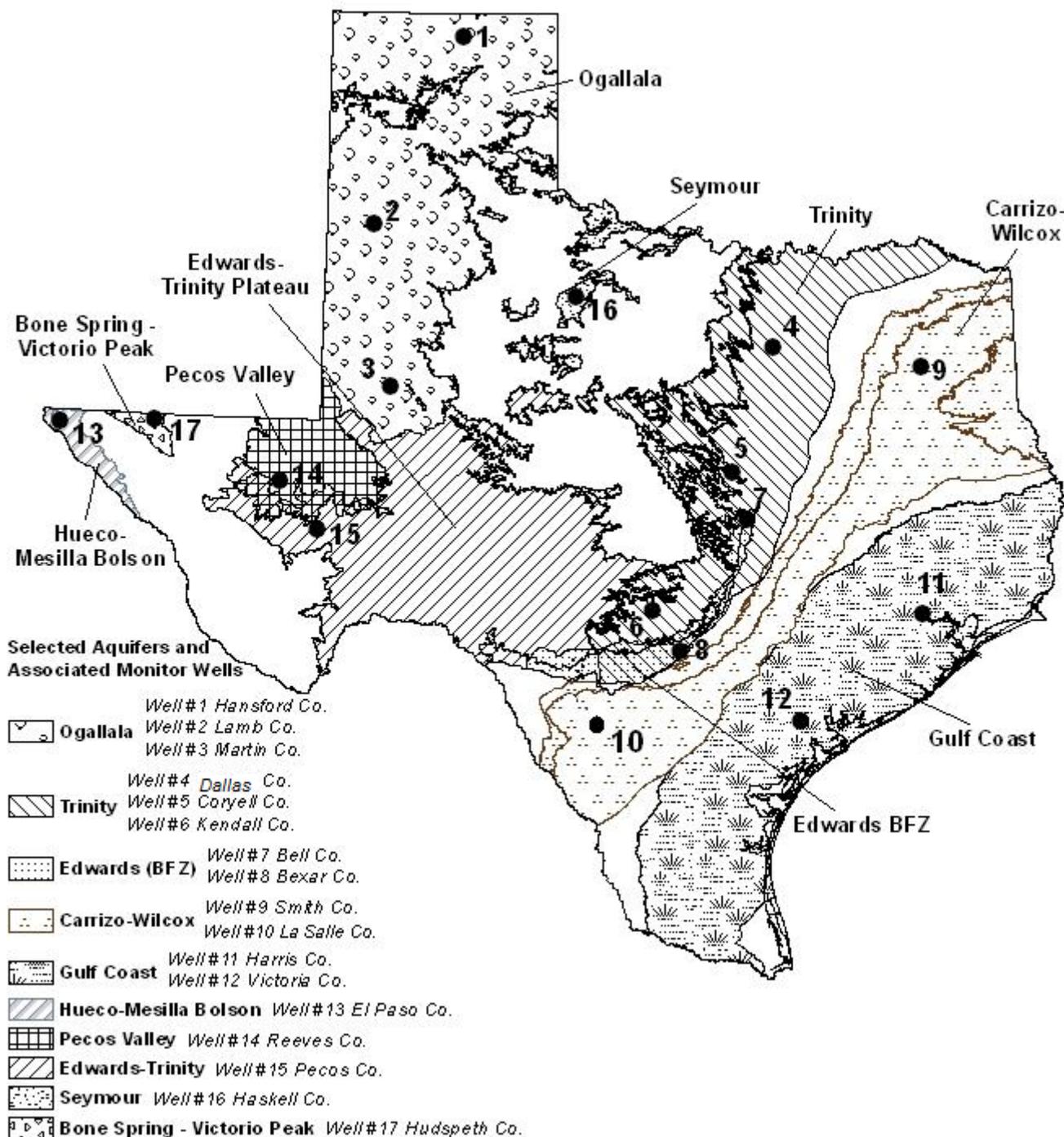
## Soil Moisture Condition



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 major portions of central, north, and east Texas are in 0.2–0.45 range but is mostly below 0.2 in west and Panhandle regions.

## AUGUST 2016 GROUNDWATER LEVELS IN OBSERVATION WELLS



August 2016

Water-level measurements were available for all 17 key monitoring wells in the state. Water levels rose in six monitoring wells since the beginning of August, ranging from an increase of 0.36 feet in the Victoria County Gulf Coast Aquifer well to 8.50 feet in the Bexar County Edwards (Balcones Fault Zone) Aquifer well. Water levels declined in 11 monitoring wells, ranging from a decline of 0.03 feet in the Lamb County Ogallala Aquifer well to 7.51 feet in the LaSalle County Carrizo-Wilcox Aquifer well. The J-17 well in San Antonio recorded a water level of 56.21 feet below land surface or 674.79 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 14.79 feet above the Stage I critical management level.

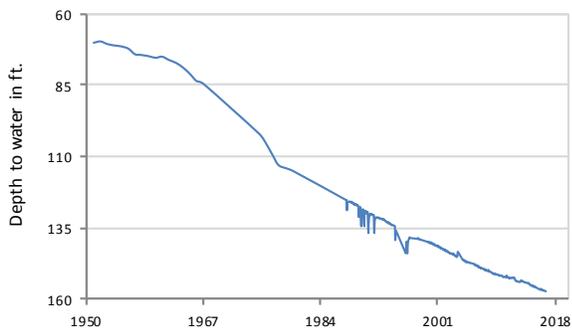
\*IDs used in this publication on the aquifer map to indicate the monitoring well location (IDs 1 - 17) are different than the TWDB's six- or seven-digit state well identification number.

Monitoring Well	August	July	Month Change	Year Change	Historical Change	First Measured
(1) Hansford 0354301	157.26	157.16	-0.10	-0.84	-87.14	1951
(2) Lamb 1053602	146.88	146.85	-0.03	-1.04	-118.71	1951
(3) Martin 2739903	144.57	144.38	-0.19	-2.81	-39.68	1964
(4) Dallas 3319101	494.70	494.23	-0.47	-2.56	-272.70	1954
(5) Coryell 4035404	517.54	512.33	-5.21	-1.55	-225.54	1955
(6) Kendall 6802609	128.23	124.56	-3.67	2.01	-68.23	1975
(7) Bell 5804816	119.44	119.29	-0.15	1.97	4.07	2008
(8) Bexar 6837203	56.21	64.71	8.50	27.10	-9.57	1932
(9) Smith 3430907	435.50	436.39	0.89	2.12	-135.5	1987
(10) La Salle 7738103	470.54	463.03	-7.51	1.38	-217.47	2003
(11) Harris 6514409	191.10	190.15	-0.95	-3.77	-55.60*	1947**
(12) Victoria 8017502	33.84	34.20	0.36	2.22	0.16	1958
(13) El Paso 4913301	295.04	295.41	0.37	-0.59	-63.14	1964
(14) Reeves 4644501	163.16	168.64	5.48	2.11	-71.07	1952
(15) Pecos 5216802	219.73	223.95	4.22	11.41	27.15	1976
(16) Haskell 2135748	46.73	46.54	-0.19	1.83	-3.73	2002
(17) Hudspeth 4807516	154.70	154.06	-0.64	-7.15	-50.78	1966

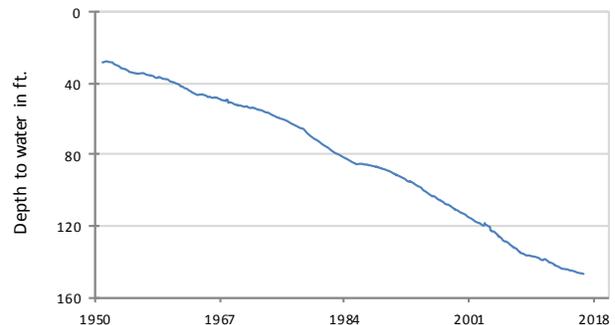
\*Change since the original measurement of 135.5 feet below land surface in 1947 (\*\*measurement not shown on the hydrograph)

## AUGUST 2016 GROUNDWATER LEVELS IN OBSERVATION WELLS

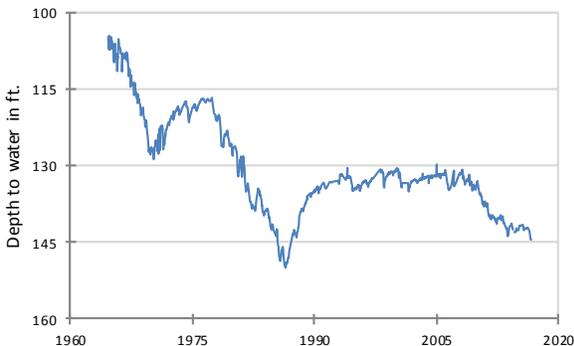
(1) State Well ID 03-54-301  
Near Spearman, Hansford County  
Ogallala Aquifer



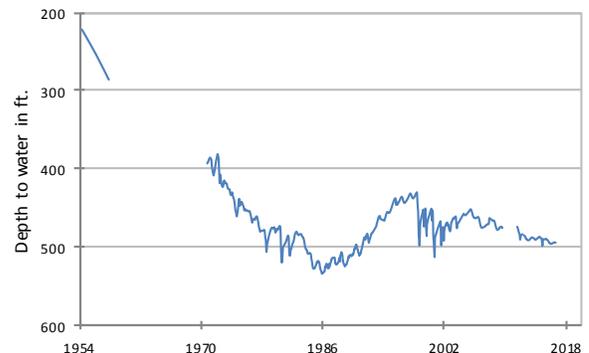
(2) State Well ID 10-53-602  
Near Earth, Lamb County  
Ogallala Aquifer



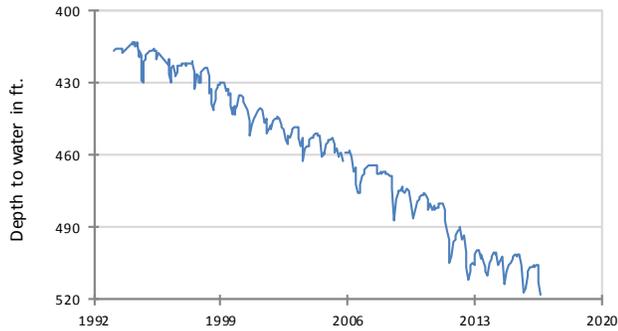
(3) State Well ID 27-39-903  
Northwest Martin County  
Ogallala Aquifer



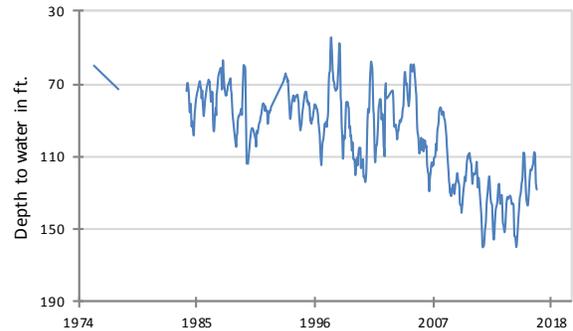
(4) State Well ID 33-19-101  
Southeast Dallas, Dallas County  
Twin Mountains Formation-Trinity Aquifer



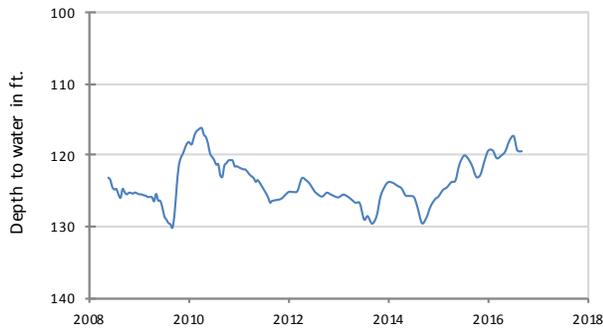
**(5) State Well ID 40-35-404  
Gatesville, Coryell County  
Hosston Formation-Trinity Aquifer**



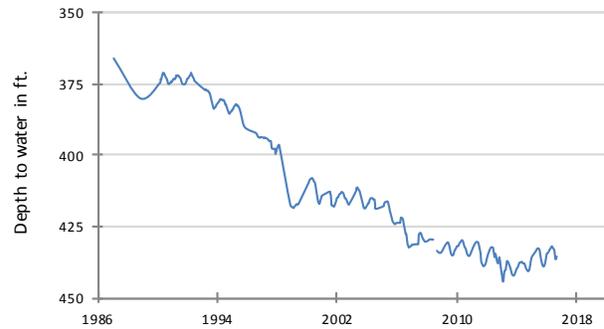
**(6) State Well ID 68-02-609  
Waring, Kendall County  
Cow Creek Formation-Trinity Aquifer**



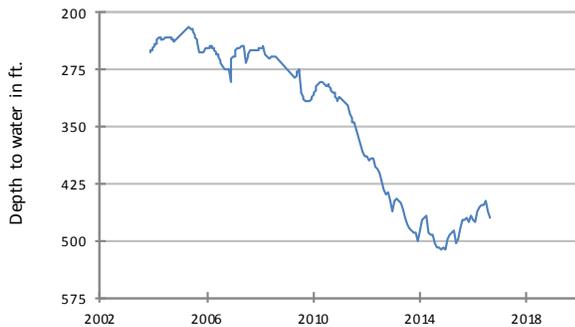
**(7) State Well ID 58-04-816  
Near Salado, Bell County  
Edwards (Balcones Fault Zone) Aquifer**



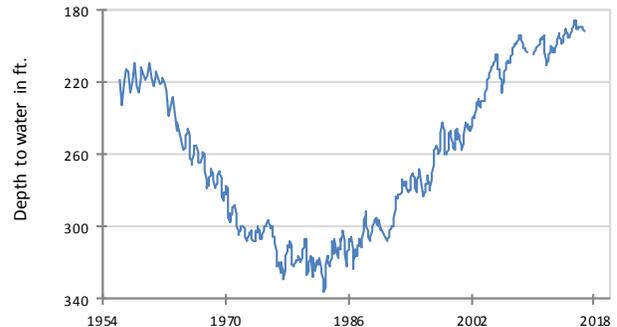
**(9) State Well ID 34-30-907  
Red Springs, Smith County  
Carrizo-Wilcox Aquifer**



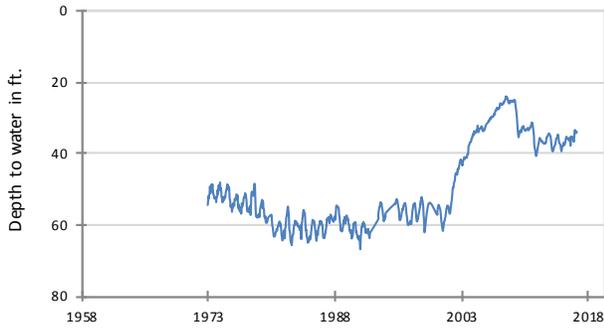
**(10) State Well ID 77-38-103  
Near Cotulla, La Salle County  
Carrizo-Wilcox Aquifer**



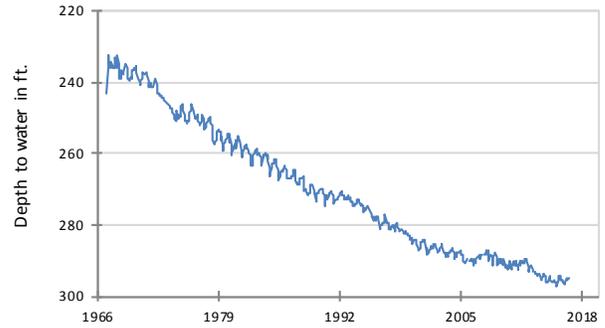
**(11) State Well ID 65-14-409  
Alief, Harris County  
Evangeline Formation-Gulf Coast Aquifer**



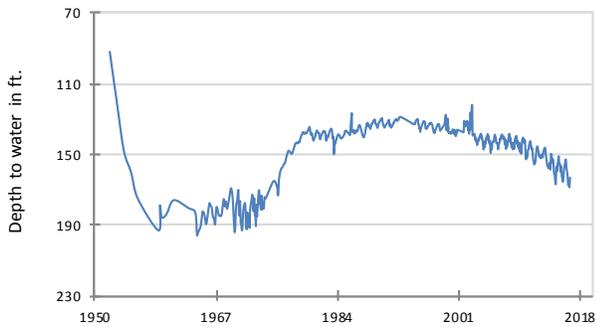
**(12) State Well ID 80-17-502**  
**Near Bloomington, Victoria County**  
**Lissie Formation-Gulf Coast Aquifer**



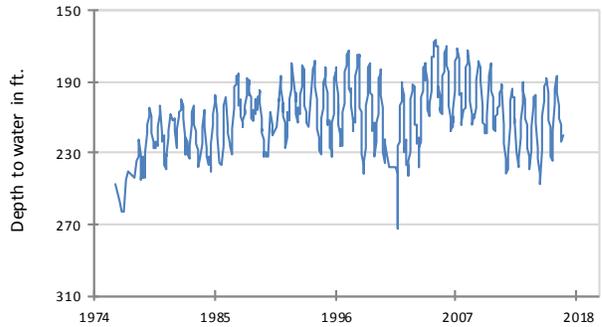
**(13) State Well ID 49-13-301**  
**El Paso, El Paso County**  
**Hueco-Mesilla Bolson Aquifer**



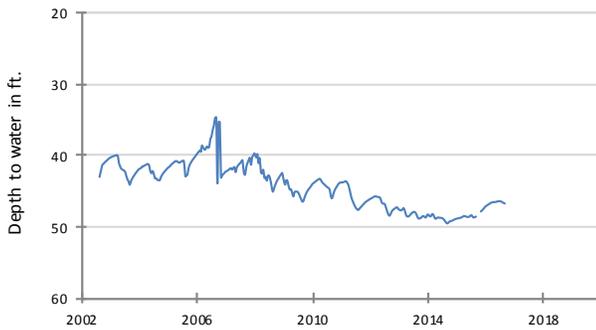
**(14) State Well ID 46-44-501**  
**Near Pecos, Reeves County**  
**Pecos Valley Aquifer**



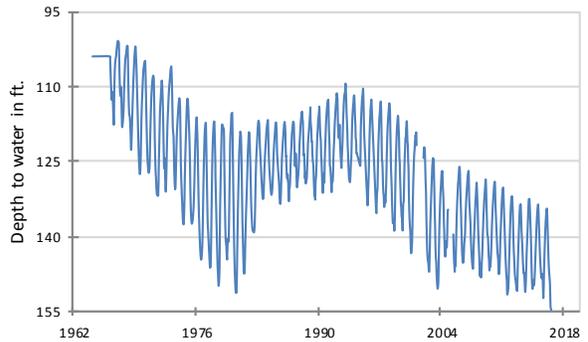
**(15) State Well ID 52-16-802**  
**Fort Stockton, Pecos County**  
**Edwards-Trinity (Plateau) Aquifer**



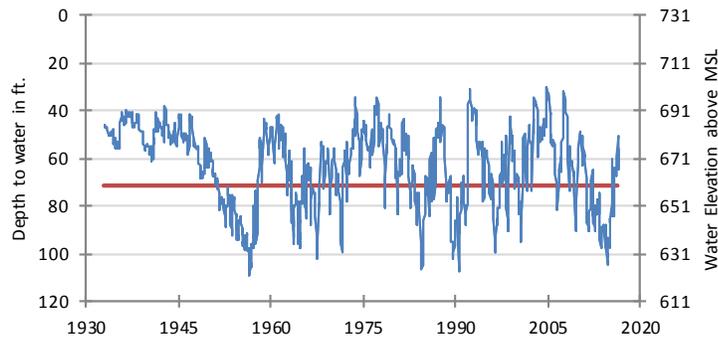
**(16) State Well ID 21-35-748**  
**Near O'Brien, Haskell County**  
**Seymour Aquifer**



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

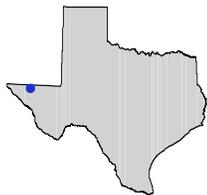


**(8) State Well ID 68-37-203 (J-17)  
In San Antonio, Bexar County  
Edwards (Balcones Fault Zone) Aquifer**



The late August water-level measurement in this Edwards (Balcones Fault Zone) Aquifer well, elevation 731 feet above mean sea level, was 56.21 feet below land surface, or 674.79 feet above mean sea level. This was 8.50 feet above last month's measurement, 27.10 feet above last year's measurement, and 9.57 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. \*\*\***



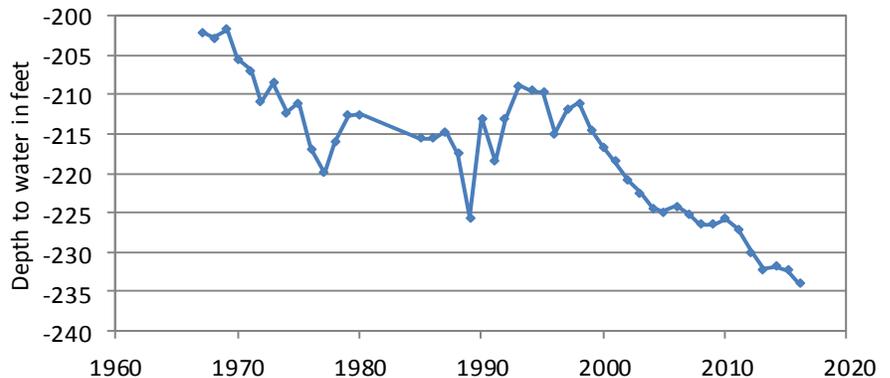
***HYDROGRAPH OF THE MONTH***

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

**Bone Springs – Victorio Peak Aquifer**

The Bone Springs – Victorio Peak Aquifer is a minor aquifer located in Northern Hudspeth County. The principal water-bearing units in the aquifer are the Permian aged Bone Springs and Victorio Peak limestones. The formations produce groundwater from solution cavities developed along joints and fracture planes. Water is generally slightly saline, with total dissolved solids of 1,000 to 3,000 milligrams per liter. In the Dell Valley area, total dissolved solids increase to 3,000 to 10,000 milligrams per liter. Since the late 1940s, pumping has been the number one means of discharge for the aquifer. Water levels have declined in the Dell Valley area from 5 to 60 feet, with an average of about 30 feet over a period of about 55 years. These declines are most likely due to pumping for irrigation. Water levels over the last 30 years have been relatively constant, except for the last few years, during which, water levels have declined because of drought.

Well #4807418, 948 feet deep  
Unused, northern Hudspeth County



The first recorded water-level measurement of this unused well was 202.05 feet below land surface in 1967 by the United States Geological Survey. The TWDB began measuring this well in 1969 and has measured every year since. This 1969 measurement of 201.69 feet below land surface was the highest recorded measurement. Over the past 15 years, the water level has been mainly declining due to continued, steady, nearby irrigation pumping. The lowest water-level measurement was recorded in 2016 at 234.03 feet below land surface.