

December 2019

## RAINFALL

Rainfall observations from the National Oceanic and Atmospheric Administration – National Weather Service (NOAA-NWS) indicate that during the month of December several climate divisions received little to no rainfall [yellow, orange and red shading, Figure 1(a)] while other climate divisions had rainfall reaching 5.7 inches in some areas [dark blue shading, Figure 1(a)]. The central Low Rolling Plains, most of the Trans Pecos, the Southern, and central and western portions of the South Central climate division received little to no rain fall this month. The northern and central portions of the High Plains received some rainfall, as did much of the North Central, Upper Coast and East Texas, northern and southern portions of the Low Rolling Plains, central and eastern Trans Pecos, northern Edwards Plateau, and eastern portions of the Southern and Low Valley climate divisions. Monthly rainfall for November was below-average [yellow and orange shading, Figure 1(b)], compared to historical data from 1981–2010, over much of the state. Exceptions being the southeastern Southern region, the southern South Central region, northwestern Edwards Plateau, central and eastern Trans Pecos, southern Low Rolling Plains and the northern High Plains.

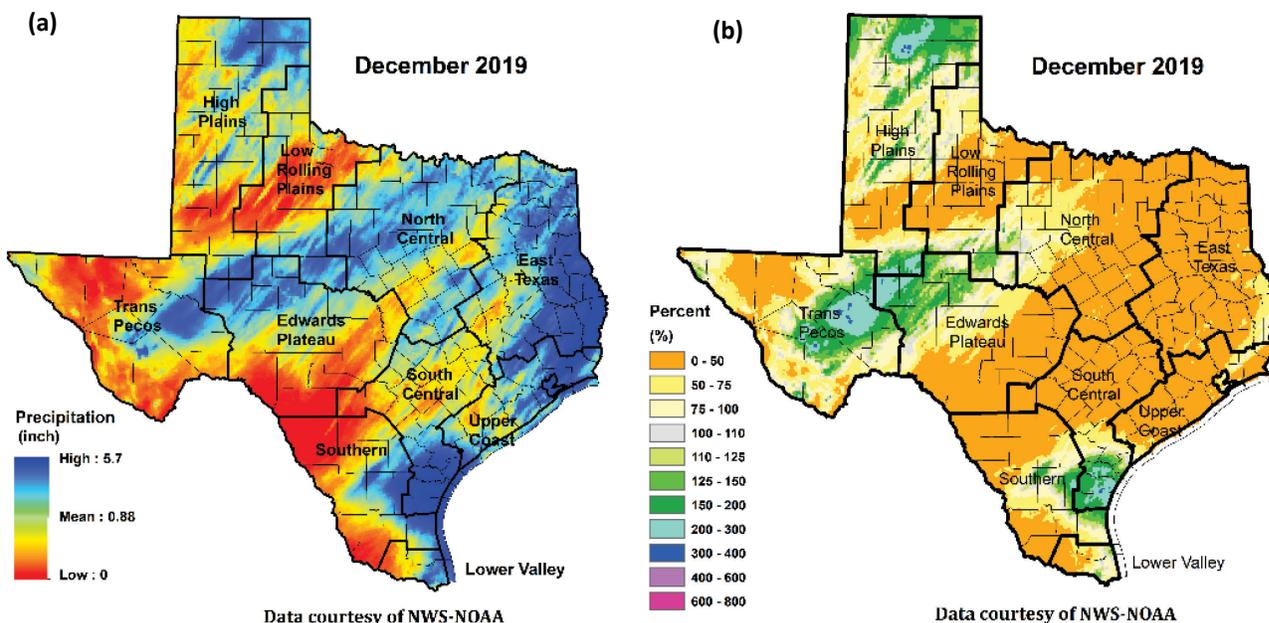
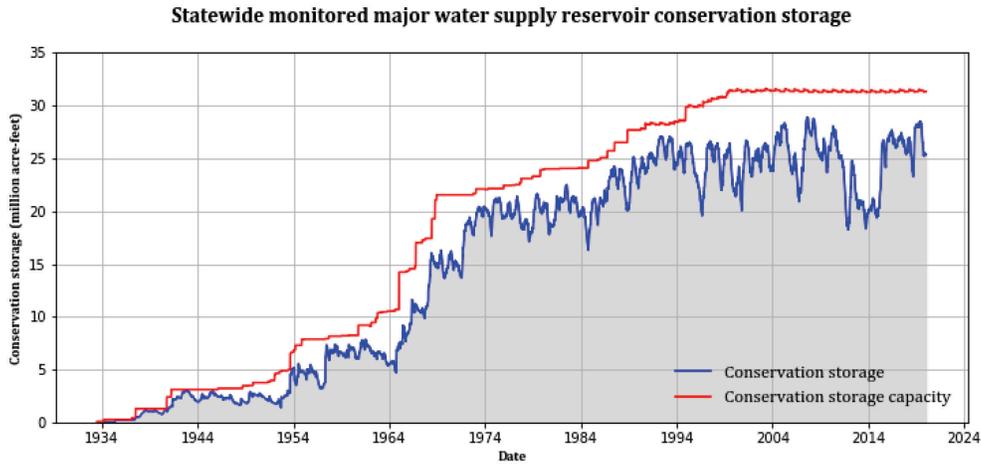


Figure 1: (a) Monthly accumulated rainfall, (b) Percent of normal rainfall

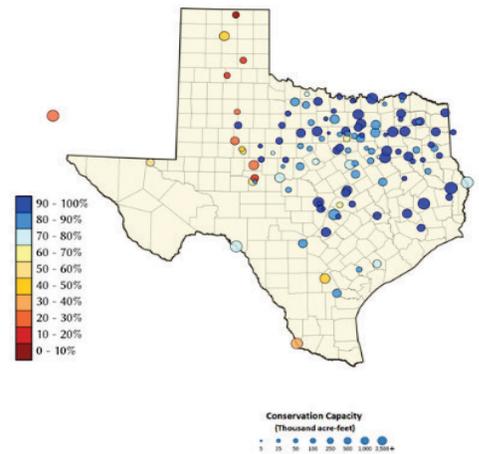
## **RESERVOIR STORAGE**

At the end of December 2019, total conservation storage\* in 118 of the state’s major water supply reservoirs plus Elephant Butte Reservoir in New Mexico was 25.6 million acre-feet or 80 percent of total conservation storage capacity (Figure 2). This is approximately 0.002 million acre-feet more than a month ago and approximately 2.6 million acre-feet less than end-December 2018.



**Figure 2:** Statewide reservoir conservation storage

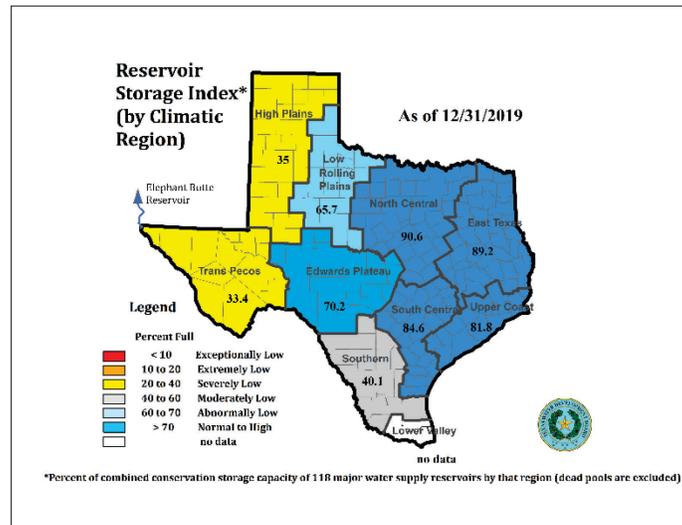
Out of 118 reservoirs in the state, 16 reservoirs held 100 percent of conservation storage capacity (Figure 3). Additionally, 35 were at or above 90 percent full. Nine reservoirs [E.V. Spence (27 percent full), Falcon (23 percent full), Greenbelt (20 percent full), J.B. Thomas (25 percent full), Mackenzie (12 percent full), O. C. Fisher (11 percent full), Palo Duro Reservoir (5 percent full), and White River (19 percent full)] remained below 30 percent full. Elephant Butte Reservoir (located in New Mexico) was at 28 percent full.



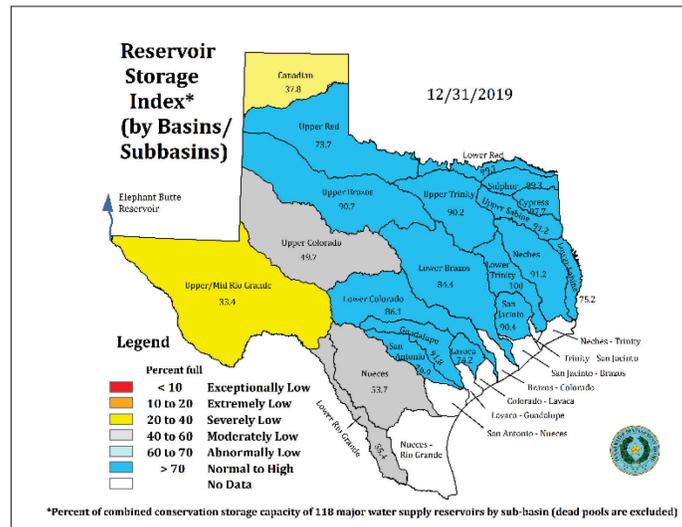
**Figure 3:** Reservoir conservation storage at end-December expressed as percent full (%)

\*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  $\geq 70$  percent full) in the Upper Coast (81.8 percent full), East Texas (89.2 percent full), North Central (90.6 percent full), South Central (84.6 percent full), and Edwards (70.2 percent full) climate divisions (Figure 4). Conservation storage in the Low Rolling Plains climate division was abnormally low (65.7 percent full). Storage in the High Plains and Trans Pecos climate divisions was severely low (35 and 33.4, respectively). Storage in the Southern climate division was moderate (40.1 percent full). Combined conservation storage by river basin or sub-basin depicts a similar picture (Figure 5). Storage in basins/sub-basins in the North, Central, and Eastern portions of the state was normal to high ( $>70$  percent full). Meanwhile the Canadian, and the Upper Mid Rio Grande had severely low storage.



**Figure 4:** Reservoir Storage Index\* by climate division at 12/31/2019



**Figure 5:** Reservoir Storage Index by river basin/sub-basin at 12/31/2019

\*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	Storage capacity	Storage at end-December		Storage change from end-Nov 2019		Storage change from end-Dec 2018	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
Abilene, Lake	7,900	5,127	65	5	0	-2,773	-35
Alan Henry Reservoir	96,207	90,085	94	-1,035	-1	6,184	6
*Amistad Reservoir (Texas & Mexico)	1,840,849	1,378,218	75	-6,025	0	20,673	1
*Amistad Reservoir (Texas)	3,275,532	1,678,537	51	25,588	1	-255,944	-8
Amon G Carter, Lake	19,266	17,666	92	-237	-1	-1,600	-8
Aquilla Lake	43,243	34,875	81	-562	-1	-8,368	-19
Arlington, Lake	40,188	36,392	91	-828	-2	-3,796	-9
Arrowhead, Lake	230,359	202,110	88	-1,619	0	-28,249	-12
Athens, Lake	29,503	28,163	95	370	1	-1,340	-5
*Austin, Lake	23,972	22,481	94	-184	0	-445	-2
B A Steinhagen Lake	69,186	64,577	93	-787	-1	5,629	8
Bardwell Lake	46,122	39,100	85	-710	-2	-7,022	-15
Belton Lake	435,225	399,555	92	-4,052	0	-35,670	-8
Benbrook Lake	85,648	62,800	73	7,381	9	-22,848	-27
Bob Sandlin, Lake	192,417	185,718	97	349	0	-6,699	-3
Bonham, Lake	11,027	9,207	83	-29	0	-1,820	-17
Brady Creek Reservoir	28,808	24,447	85	-137	0	-4,361	-15
Bridgeport, Lake	366,236	311,893	85	-1,760	0	-54,343	-15
*Brownwood, Lake	130,868	108,046	83	-1,034	0	-22,822	-17
Buchanan, Lake	860,607	777,268	90	1,920	0	-47,894	-6
Caddo, Lake	29,898	29,898	100	0	0	0	0
Canyon Lake	378,781	353,959	93	-1,895	0	-24,822	-7
Cedar Creek Reservoir in Trinity	644,686	565,248	88	-7,283	-1	-79,438	-12
Champion Creek Reservoir	41,580	27,638	66	-139	0	-1,254	-3
Cherokee, Lake	40,094	40,094	100	1,230	3	0	0
Choke Canyon Reservoir	662,820	300,883	45	-4,038	0	-62,039	-9
*Cisco, Lake	29,003	25,252	87	-171	0	769	3
Coleman, Lake	38,075	32,956	87	-240	0	-5,119	-13
Colorado City, Lake	31,040	22,316	72	-733	-2	-8,724	-28
*Coletto Creek Reservoir	30,758	13,836	45	-108	0	-1,668	-5
Conroe, Lake	410,988	368,883	90	-1,811	0	-42,105	-10
Corpus Christi, Lake	256,062	193,795	76	-3,013	-1	-62,267	-24
Crook, Lake	9,195	9,059	99	-136	-1	-136	-1
Cypress Springs, Lake	66,756	66,756	100	0	0	0	0
E. V. Spence Reservoir	517,272	138,745	27	-2,358	0	505	0
Eagle Mountain Lake	179,880	161,009	90	-4,289	-2	-18,871	-10
Elephant Butte Reservoir (Texas)	852,491	240,417	28	25,031	3	190,954	22
Elephant Butte Reservoir (Total Stora	1,973,358	556,520	28	57,941	3	442,022	22
*Falcon Reservoir (Texas & Mexico)	1,551,007	502,138	32	16,236	1	-296,894	-19
*Falcon Reservoir (Texas)	2,646,817	616,565	23	-4,130	0	-555,019	-21
Fork Reservoir, Lake	605,061	544,108	90	-7,875	-1	-60,953	-10
Fort Phantom Hill, Lake	70,030	61,244	87	533	1	-8,786	-13
Georgetown, Lake	36,823	25,261	69	818	2	-11,562	-31
Graham, Lake	45,288	38,332	85	-456	-1	-6,956	-15
Granbury, Lake	132,949	131,647	99	1,214	1	810	1

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

Name of lake or reservoir	Storage capacity	Storage at end-December		Storage change from end-Nov 2019		Storage change from end-Dec 2018	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
<i>Continued</i>							
Granger Lake	51,822	51,822	100	0	0	0	0
Grapevine Lake	163,064	163,064	100	0	0	0	0
Greenbelt Lake	59,968	11,971	20	-7	0	-279	0
*Halbert, Lake	6,033	5,084	84	86	1	-652	-11
Hords Creek Lake	8,443	6,722	80	-63	0	1,130	13
Houston County Lake	17,113	17,113	100	0	0	0	0
Houston, Lake	130,147	120,531	93	865	1	-9,616	-7
Hubbard Creek Reservoir	313,298	273,450	87	-3,032	0	-39,848	-13
Hubert H Moss Lake	24,058	23,853	99	-172	0	-205	0
Inks, Lake	13,962	12,937	93	-38	0	-76	0
J. B. Thomas, Lake	199,931	49,947	25	-1,780	0	-23,944	-12
Jacksonville, Lake	25,670	24,945	97	307	1	-725	-3
Jim Chapman Lake (Cooper)	260,332	222,658	86	-4,434	-2	-37,674	-14
Joe Pool Lake	175,358	154,535	88	-912	0	-20,823	-12
Kemp, Lake	245,307	202,696	83	-1,718	0	-42,611	-17
Kickapoo, Lake	86,345	70,452	82	-1,679	-2	-15,893	-18
Lavon Lake	406,388	337,837	83	5,667	1	-68,551	-17
Leon, Lake	27,762	23,618	85	-219	0	-4,144	-15
Lewisville Lake	563,228	563,228	100	15,282	3	0	0
Limestone, Lake	203,780	163,496	80	-3,772	-2	-40,284	-20
*Livingston, Lake	1,741,867	1,741,867	100	0	0	0	0
*Lost Creek Reservoir	11,950	11,227	94	23	0	-723	-6
Lyndon B Johnson, Lake	115,249	109,117	95	-1,642	-1	8,272	7
Mackenzie Reservoir	46,450	5,348	12	0	0	-441	0
Marble Falls, Lake	6,901	6,831	99	0	0	847	12
Martin, Lake	75,726	59,588	79	-868	-1	-16,138	-21
Medina Lake	254,823	199,030	78	-7,777	-3	-50,483	-20
Meredith, Lake	500,000	208,597	42	819	0	18,082	4
Millers Creek Reservoir	26,768	22,901	86	-340	-1	-3,867	-14
*Mineral Wells, Lake	5,273	4,760	90	-36	0	-513	-10
Monticello, Lake	34,740	28,355	82	104	0	-2,501	-7
Mountain Creek, Lake	22,850	22,850	100	0	0	0	0
Murvaul, Lake	38,285	35,343	92	-34	0	-2,942	-8
Nacogdoches, Lake	39,522	34,857	88	-199	0	-4,665	-12
Nasworthy		no data		26,612	67	26,175	66
Navarro Mills Lake	49,827	38,544	77	-944	-2	-11,283	-23
New Terrell City Lake	8,583	8,146	95	-110	-1	-437	-5
Nocona, Lake (Farmers Crk)	21,444	19,384	90	-180	0	-2,060	-10
North Fork Buffalo Creek Reservoir	15,400	11,493	75	-152	0	-3,907	-25
O' the Pines, Lake	241,363	241,363	100	0	0	0	0
O. C. Fisher Lake	119,445	12,976	11	-104	0	-4,311	-4
*O. H. Ivie Reservoir	554,340	384,906	69	-300	0	110,053	20
Oak Creek Reservoir	39,210	34,372	88	0	0	-4,838	-12

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS								
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	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)	
<i>Continued</i>								
Palestine, Lake	367,303	333,206	91	3,252	1	-34,097	-9	
Palo Duro Reservoir	61,066	3,285	5	-260	0	2,926	5	
Palo Pinto, Lake	26,766	20,146	75	-484	-2	-6,620	-25	
Pat Cleburne, Lake	26,008	21,342	82	-326	-1	-4,666	-18	
*Pat Mayse Lake	113,683	113,683	100	0	0	0	0	
Possum Kingdom Lake	538,139	521,154	97	1,745	0	-6,497	-1	
Proctor Lake	54,762	39,906	73	-235	0	-14,856	-27	
Ray Hubbard, Lake	439,559	381,123	87	-2,940	0	-58,018	-13	
Ray Roberts, Lake	788,167	788,167	100	0	0	0	0	
Red Bluff Reservoir	151,110	95,228	63	2,586	2	-2,024	-1	
Richland-Chambers Reservoir	1,087,839	934,553	86	-14,111	-1	-153,286	-14	
Sam Rayburn Reservoir	2,857,077	2,606,127	91	14,872	1	-250,950	-9	
Somerville Lake	150,293	146,713	98	-1,447	0	-3,580	-2	
Squaw Creek, Lake	151,250	146,372	97	-309	0	-4,878	-3	
Stamford, Lake	51,570	45,087	87	-704	-1	-6,483	-13	
Stillhouse Hollow Lake	227,771	206,884	91	-3,394	-1	-20,887	-9	
Striker, Lake	16,934	16,934	100	0	0	0	0	
Sweetwater, Lake	12,267	11,945	97	106	1	-322	-3	
*Sulphur Springs, Lake	17,747	16,489	93	-273	-2	-492	-3	
Tawakoni, Lake	871,685	808,522	93	-6,724	0	-63,163	-7	
Texana, Lake	159,566	118,319	74	-6,178	-4	-39,779	-25	
Texoma, Lake (Texas & Oklahoma)	1,258,113	1,258,113	100	0	0	0	0	
Texoma, Lake (Texas)	2,525,281	2,603,147	100	-43,007	-2	-195,351	-8	
Toledo Bend Reservoir (Texas & Louisiana)	2,236,450	1,680,788	75	17,309	1	-555,662	-25	
Toledo Bend Reservoir (Texas)	4,472,900	3,365,677	75	34,619	1	-1,271,120	-28	
Travis, Lake	1,113,348	909,530	82	-17,886	-2	-203,818	-18	
Twin Buttes Reservoir	182,454	115,809	63	1,696	1	11,869	7	
Tyler, Lake	72,073	62,549	87	172	0	-9,524	-13	
Waco, Lake	189,418	150,364	79	-4,033	-2	-39,054	-21	
Waxahachie, Lake	10,780	9,794	91	383	4	-986	-9	
Weatherford, Lake	17,812	15,095	85	10	0	-2,707	-15	
White River Lake	29,880	5,590	19	-174	0	770	3	
Whitney, Lake	553,344	424,399	77	-708	0	-128,945	-23	
Worth, Lake	33,495	27,486	82	-419	-1	-6,009	-18	
Wright Patman Lake	122,593	122,593	100	0	0	0	0	
<b>STATEWIDE TOTAL</b>								
<b>STATEWIDE TOTAL</b>	<b>32,160,515</b>	<b>25,590,311</b>	<b>80</b>	<b>2,322</b>	<b>0</b>	<b>-2,567,733</b>	<b>-8</b>	

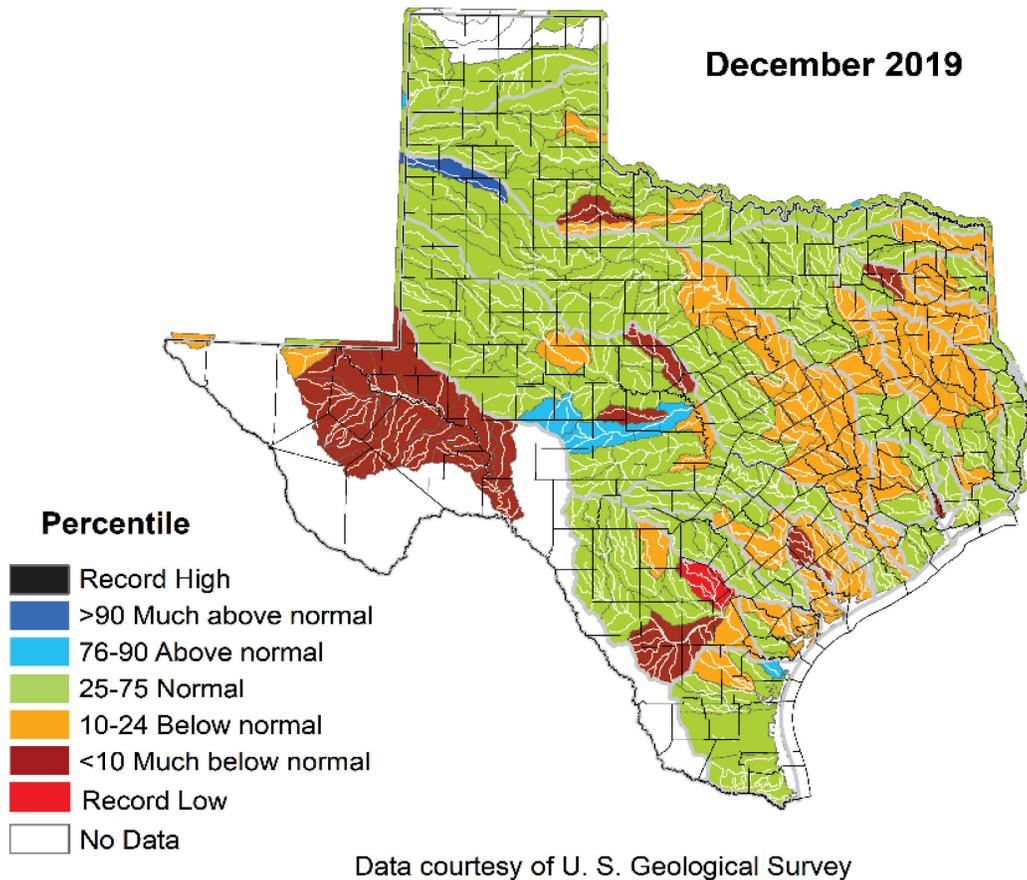
\* Total volume below elevation of conservation pool top is used as conservation storage capacity, because the dead pool storage is unknown.  
\*\*Monthly and yearly changes do not include reservoirs that did not have data in the last month or last year.

**Note:**

Conservation storage capacity is the space available to store water above the lowest outlet and below the top of the 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 the 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

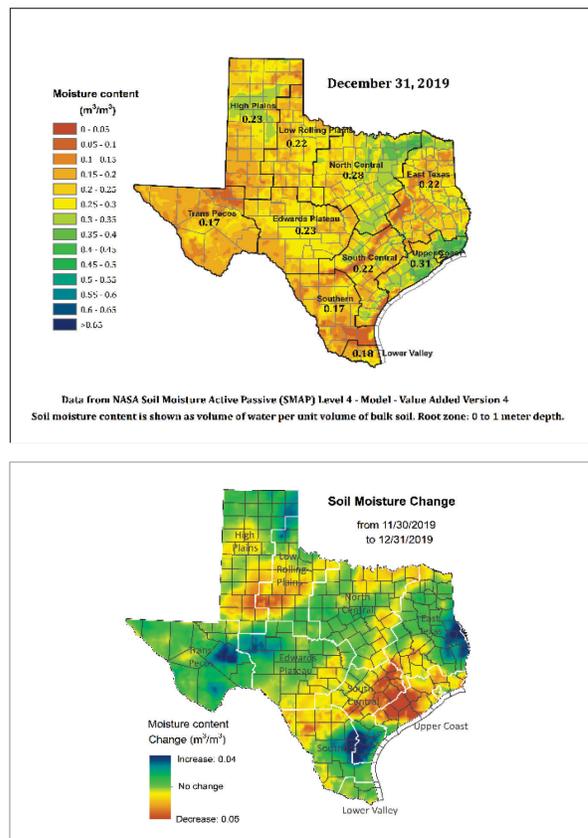
Computed runoff by hydrologic unit codes for December 2019 show that much of the state had near normal (25–75<sup>th</sup> percentile, green shading in Figure 6) streamflow. Some sub-watersheds in the upper Colorado and upper Red river basins had above normal (76–90<sup>th</sup> percentile, light blue shading in Figure 6). Several sub-watersheds in the upper and lower Colorado, Nueces, Guadalupe, Lavaca, mid- and lower Brazos, central Red, upper Sabine and upper Neches, and the Sulphur river had below normal 10–24<sup>th</sup> percentile, light brown shading in Figure 6) streamflow. Compared to November 2019, more sub-watersheds had much below normal (less than the 10<sup>th</sup> percentile, dark brown shading in Figure 6) streamflow. These include sub-watersheds in the mid-Red, upper Rio Grande, upper Colorado, upper Sabine, the lower Trinity-San Jacinto, lower, and upper Nueces river basins. A record low (red shading in Figure 6) that began in October 2019 continued in the upper Nueces River Basin in December 2019.



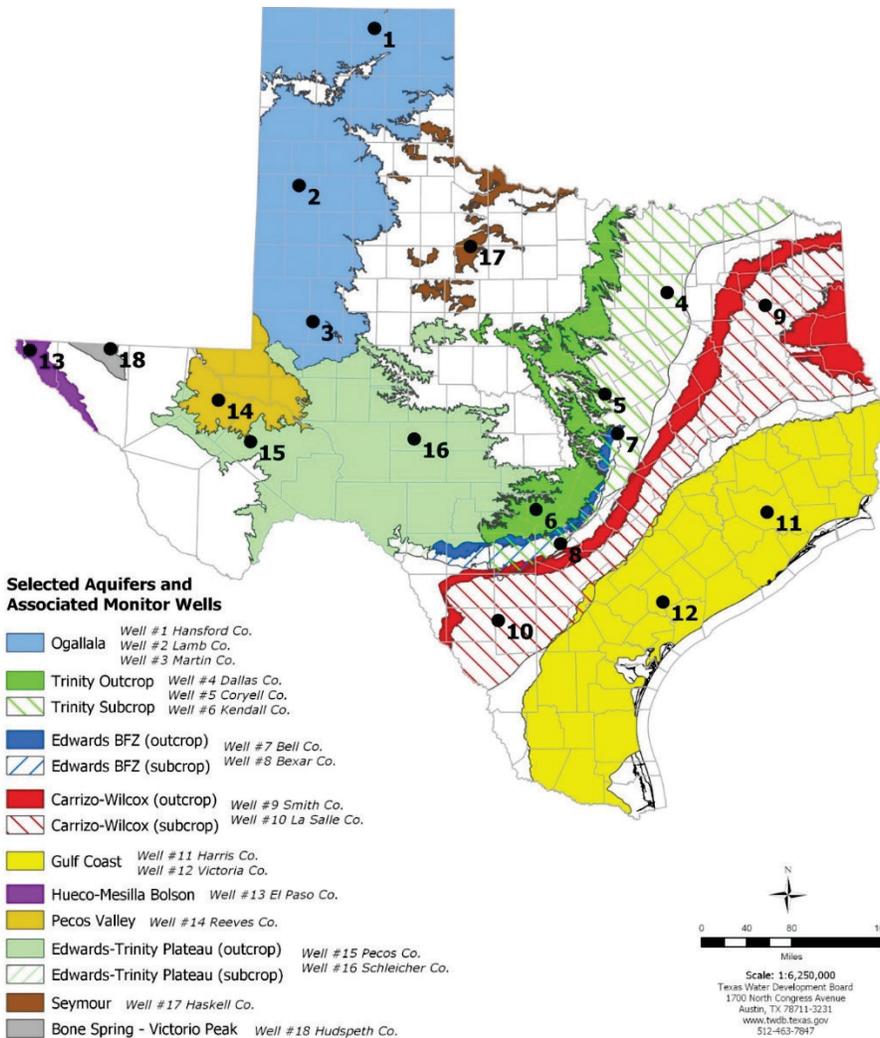
**Figure 6:** Runoff percentiles by the U.S. Geological Survey’s Hydrologic Unit Code

## SOIL MOISTURE CONDITIONS

Root zone soil moisture at the end of December 2019 [Figure 7(a)] was moderate [ $> 0.20$  cubic meters of water per bulk cubic meter soil ( $m^3/m^3$ )] in the majority of the state. Exceptions of low soil moisture [ $> 0.15$  cubic meters of water per bulk cubic meter soil ( $m^3/m^3$ )] in areas of the northern and southern High Plains, the northeastern corner of the Trans Pecos, northern and southern portion of the Southern climate division and a narrow band running through the center of the South Central climate division and spreading through western East Texas. In other climate divisions, root zone soil moisture was high [ $< 0.3$  cubic meters of water per bulk cubic meter soil ( $m^3/m^3$ )]. These divisions include the eastern portion of the North Central region, northern East Texas, a large portion of the Upper Coast, and portions of the High Plains and South Central regions. Compared to conditions at the end of November 2019, soil moisture content increased [green to blue shading in Figure 7(b)] in the northern and central regions of the High Plains, northern and southern portions of the Low Rolling Plains, the majority of the North Central, Lower Valley, Trans Pecos, and East Texas regions, northwestern Edwards Plateau, southern South Central, and southeastern portions of the Southern climate division. Soil moisture content decreased [brown and yellow shading in Figure 7(b)] in portions of the High Plains, Edwards Plateau, North Central and Southern, South Central and Upper Coast regions.



**Figure 7:** Root zone soil moisture conditions on December 31, 2019 (a) and the difference in root zone soil moisture between end-November 2019 and end-December 2019 (b)



## DECEMBER 2019 GROUNDWATER LEVELS IN OBSERVATION WELLS

December 2019

Water-level measurements were available for 17 key monitoring wells in the state. Water levels rose in 10 monitoring wells since the beginning of December, ranging from an increase of 0.11 feet in the El Paso County Hueco-Mesilla Bolson Aquifer well (#13 on map) to 7.40 feet in the Pecos County Edwards-Trinity Plateau Aquifer (#15 on map). Water levels declined in 5 monitoring wells, ranging from a decline of -0.03 feet in the Lamb County Ogallala Aquifer well (#2 on map) to -1.30 feet in the Bexar County Edwards (Balcones Fault Zone) Aquifer well (#8 on map). The J-17 well (#8 on map) in San Antonio recorded a water level of 59.00 feet below land surface or 671.6 feet above mean sea level. Water levels are 12 feet above the Stage 1 critical management level for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer.

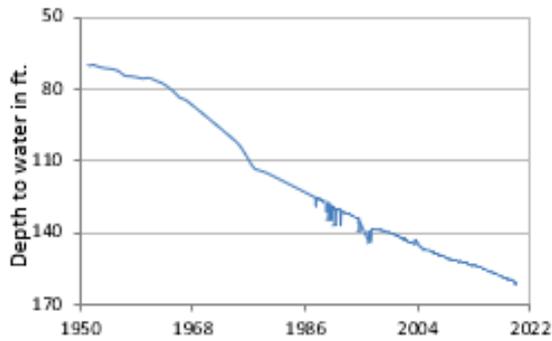
**\*Well numbers used in this publication on the aquifer map to indicate the monitoring well location (numbers 1 - 17) are different than the TWDB's seven-digit state well number.**

Monitoring Well	December	November	Month Change	Year Change	Historical Change	First Measured
(1) Hansford 0354301	161.06	NA	NA	-1.54	-90.94	1951
(2) Lamb 1053602	150.65	150.62	-0.03	-1.14	-122.48	1951
(3) Martin 2739903	143.74	143.54	-0.20	0.71	-38.85	1964
(4) Dallas 3319101	497.05	496.99	-0.06	1.82	-275.05	1954
(5) Coryell 4035404	533.20	534.10	0.90	-6.64	-241.20	1955
(6) Kendall 6802609	140.37	140.81	0.44	-12.67	-80.37	1975
(7) Bell 5804816	123.11	122.55	-0.56	-2.24	0.40	2008
(8) Bexar 6837203	59.00	57.70	-1.30	-14.19	-12.36	1932
(9) Smith 3430907	436.51	437.54	1.03	-1.47	-136.51	1977
(10) La Salle 7738103	NA	528.98	NA	NA	NA	2003
(11) Harris 6514409	192.68	193.36	0.68	-1.68	-57.18*	1947**
(12) Victoria 8017502	33.14	35.51	2.37	1.81	0.86	1958
(13) El Paso 4913301	296.28	296.39	0.11	-1.61	-64.38	1964
(14) Reeves 4644501	160.25	NA	NA	3.39	-68.16	1952
(15) Pecos 5216802	186.91	194.31	7.40	-1.94	59.97	1976
(16) Schleicher 5512134	282.52	282.74	0.22	-17.47	19.38	2003
(17) Haskell 2135748	44.30	44.67	0.37	1.87	-1.30	2002
(18) Hudspeth 4807516	142.86	146.55	3.69	0.31	-38.94	1966

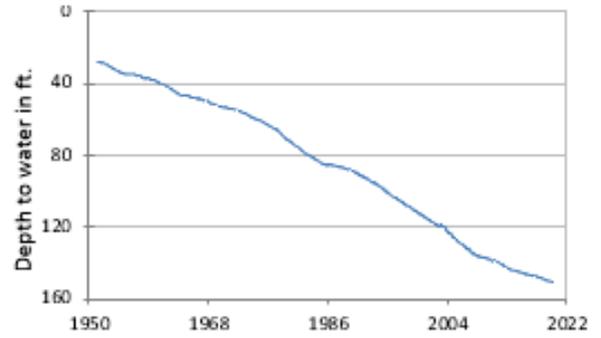
\*Change since the original measurement of 135.5 feet below land surface in 1947 (\*\*measurement not shown on the hydrograph)

## December 2019 OBSERVATION WELL HYDROGRAPHS

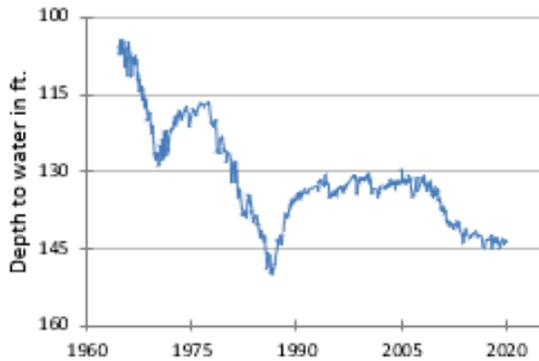
**(1) State Well #03-54-301  
Near Spearman, Hansford County  
Ogallala Aquifer**



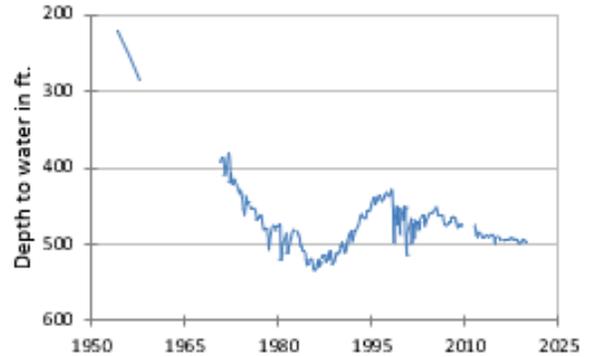
**(2) State Well #10-53-602  
Near Earth, Lamb County  
Ogallala Aquifer**



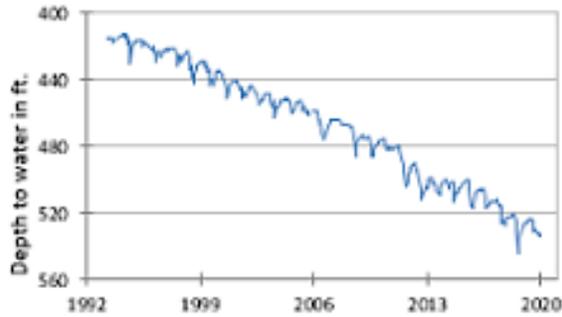
**(3) State Well #27-39-903  
Northwest Martin County  
Ogallala Aquifer**



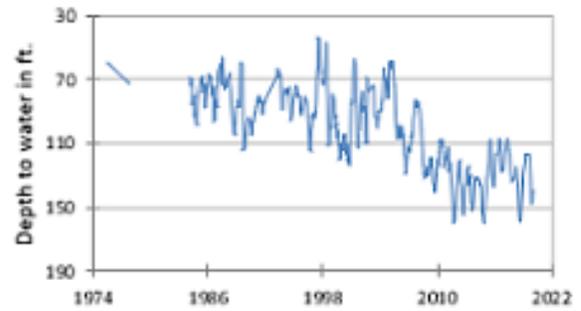
**(4) State Well #33-19-101  
Southeast Dallas, Dallas County  
Twin Mountains Formation-Trinity  
Aquifer**



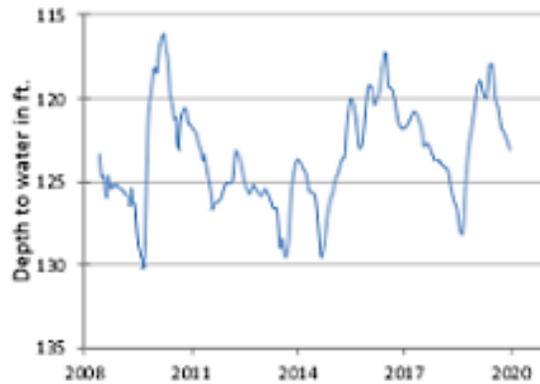
(5) State Well #40-35-404  
Gatesville, Coryell County  
Hosston Formation-Trinity Aquifer



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



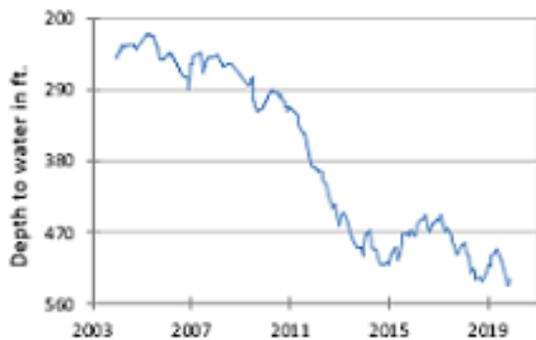
(7) State Well #58-04-816  
Near Salado, Bell County  
Edwards (Balcones Fault Zone) Aquifer



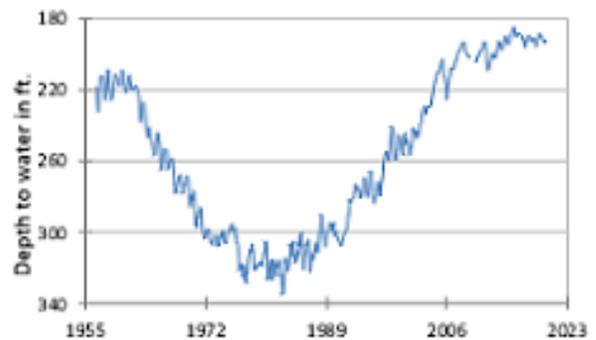
(9) State Well #34-30-907  
Red Springs, Smith County  
Carrizo-Wilcox Aquifer



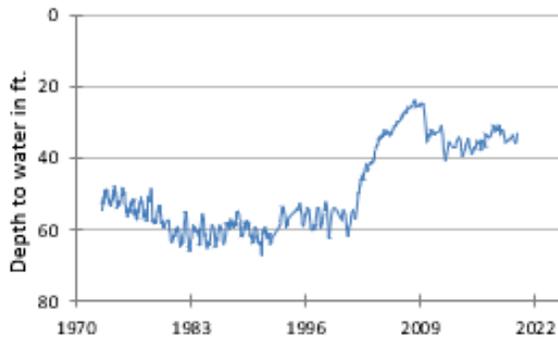
(10) State Well #77-38-103  
Near Cotulla, La Salle County  
Carrizo-Wilcox Aquifer



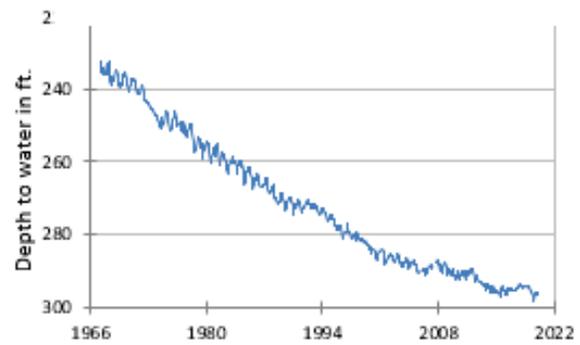
(11) State Well #65-14-409  
Alief, Harris County  
Evangeline Formation-Gulf Coast Aquifer



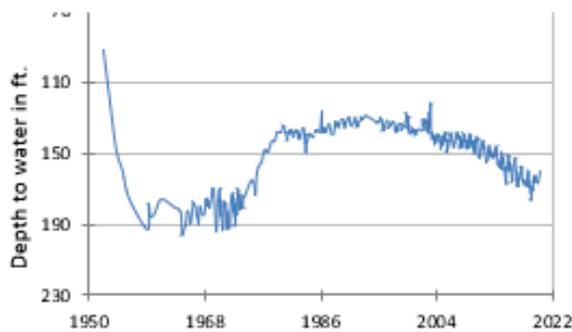
(12) State Well #80-17-502  
Near Bloomington, Victoria County  
Lissie Formation-Gulf Coast Aquifer



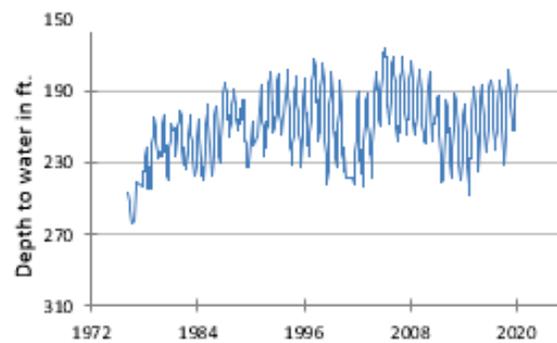
(13) State Well #49-13-301  
El Paso, El Paso County  
Hueco-Mesilla Bolson Aquifer



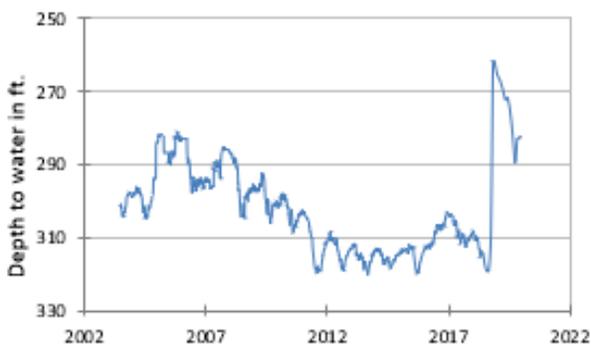
(14) State Well #46-44-501  
Near Pecos, Reeves County  
Pecos Valley Aquifer



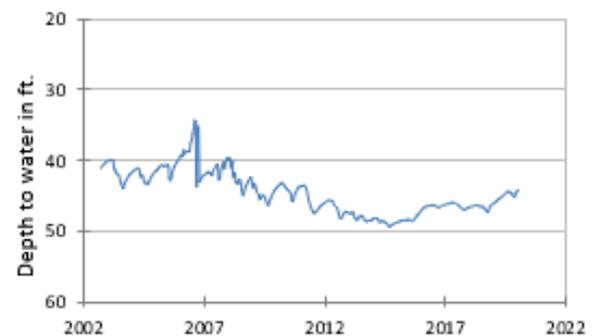
(15) State Well #52-16-802  
Fort Stockton, Pecos County  
Edwards-Trinity (Plateau) Aquifer



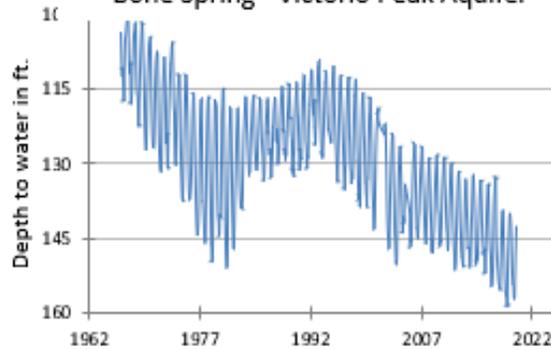
(16) State Well #55-12-134  
Eldorado, Schleicher County  
Trinity Aquifer



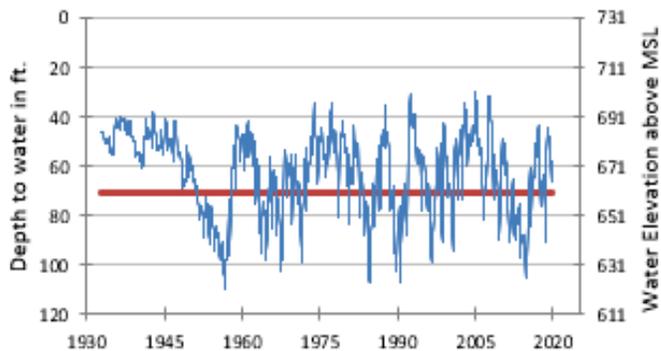
(17) State Well #21-35-748  
Near O'Brien, Haskell County  
Seymour Aquifer



(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 December water-level measurement in this Edwards (Balcones Fault Zone) Aquifer well, elevation 731 feet above mean sea level, was 59.00 feet below land surface, or 671.60 feet above mean sea level. This was 1.30 feet below last month's measurement, 14.19 feet below last year's measurement and 12.36 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.**



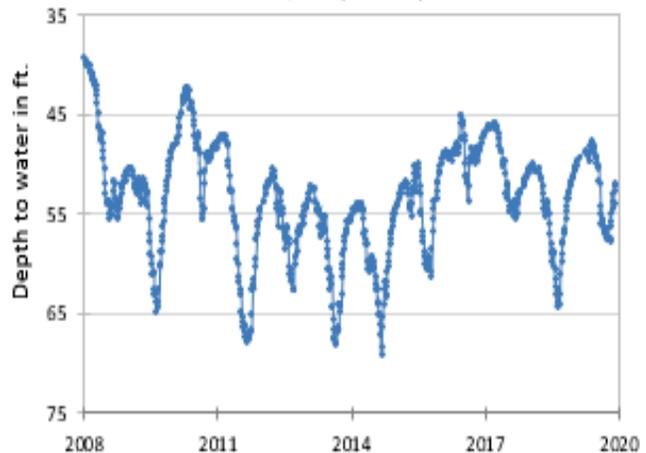
## HYDROGRAPH OF THE MONTH

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

The Ellenburger-San Saba Aquifer is a minor aquifer that is found in parts of 15 counties located in the Llano Uplift area of Central Texas. The aquifer is made up of the Tanyard, Gorman, and Honeycut formations of the Ellenburger Group and the San Saba Limestone Member of the Wilberns Formation. The aquifer consists of a sequence of limestone and dolomite that crop out in a circular pattern around the Llano Uplift and dip radially into the subsurface away from the center of the uplift to depths of approximately 3,000 feet. Regional block faulting has significantly compartmentalized the aquifer. The maximum thickness of the aquifer is about 2,700 feet. Water is held in fractures, cavities, and solution channels and is commonly under confined conditions. The Ellenburger-San Saba is highly permeable in places, as indicated by wells that yield as much as 1,000 gallons per minute and springs that flow from the aquifer, maintaining the base flow of streams in the area. Water produced from the aquifer is inherently hard and usually has less than 1,000 milligrams per liter of total dissolved solids. Most of the groundwater is used for municipal purposes, and the remainder for irrigation and livestock.

### Ellenburger-San Saba Aquifer

Well #57-51-407, 228 feet deep  
unused, Gillespie County



In January of 2008 the Texas Water Development Board installed an automatic water-level recorder in the unused well. The recorder would take hourly measurements (displayed online) and near-weekly measurements (in the groundwater database). The initial measurement of 39.36 ft below land surface is the highest level on record, recorded on January 10, 2008. The period of record reveals fluctuations in water level that are likely attributed to the seasonality of pumping for irrigation. Overall, water levels typically remain between 45 and 65 feet below land surface.



Far away (left), and close-up (right) images of well #57-51-407.