

Texas **W**ater **C**onditions **R**eport

October 2020

RAINFALL

Little to no rain fell over the majority of the Trans Pecos, Edwards Plateau, South Central, Lower Valley, northern and western Southern, southern High Plains, southern Low Rolling Plains, western Upper Coast, southwestern East Texas, and southern and western North Central climate divisions [yellow, orange and red shading, Figure 1(a)].

Some rainfall [light blue and dark blue shading, Figure 1(a)] was recorded over portions of northern High Plains, northern Low Rolling Plains, northern and central North Central, northern and eastern East Texas, eastern Upper Coast, southeastern Southern, and eastern and western Lower Valley climate divisions, reaching 10.94 inches in portions of the state [dark blue shading, Figure 1(a)].

Monthly rainfall for October was below-average [yellow and orange shading, Figure 1(b)], compared to historical data from 1981–2010, across the majority of Texas. Exceptions to this were in portions of northeastern High Plains, northeastern Low Rolling Plains, southeastern East Texas, and eastern Upper Coast climate divisions where above average rainfall occurred [green shading, Figure 1(b)].

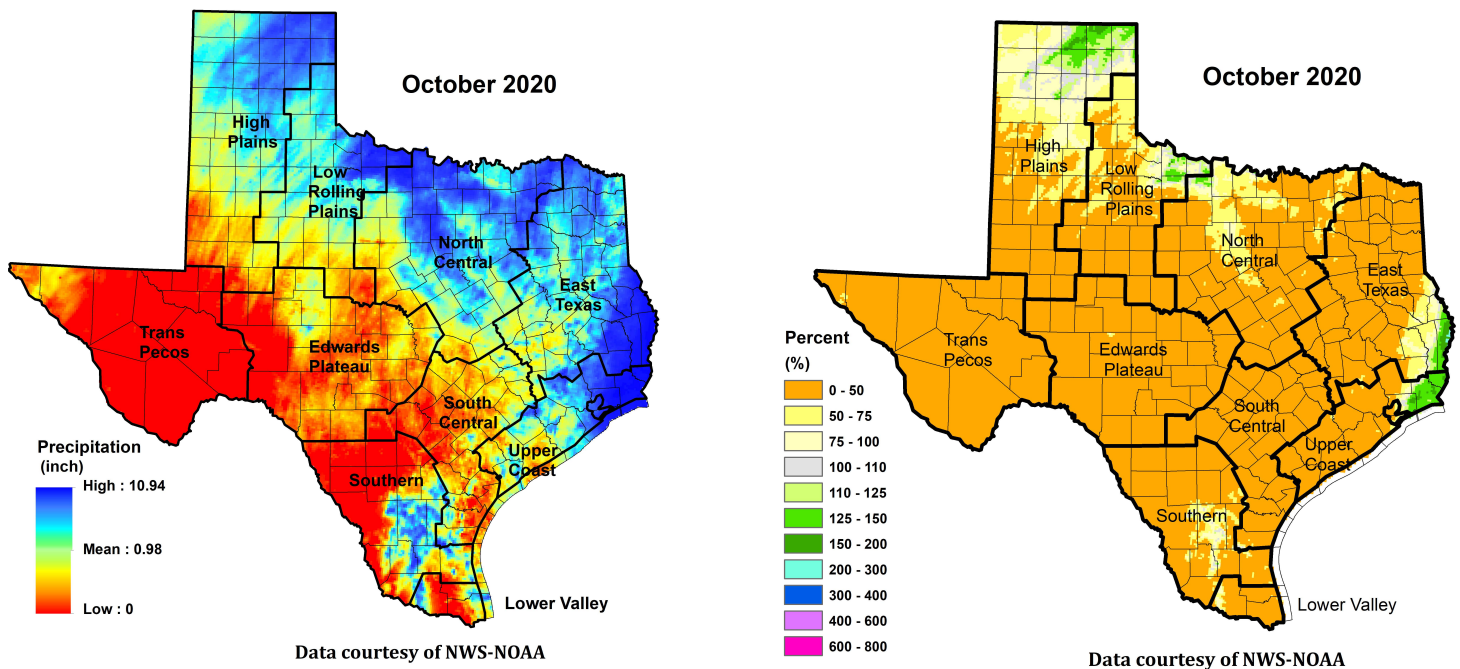


Figure 1: (a) Monthly accumulated rainfall and (b) Percent of normal rainfall

RESERVOIR STORAGE

At the end of October 2020, total conservation storage* in 118 of the state’s major water supply reservoirs plus Elephant Butte Reservoir in New Mexico was 25.22 million acre-feet or 78 percent of total conservation storage capacity (Figure 2). This is approximately 0.5 million acre-feet less than a month ago and approximately 0.44 million acre-feet less than the end of October 2019.

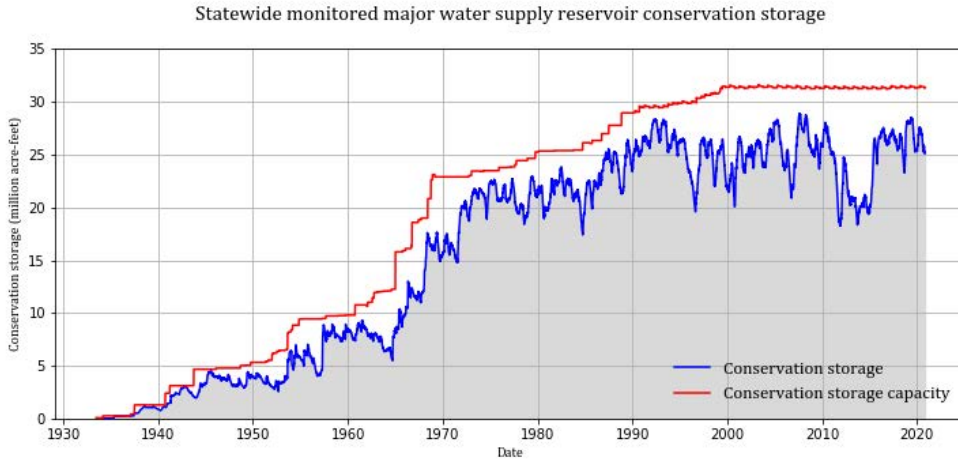


Figure 2: Statewide reservoir conservation storage

Out of 118 reservoirs in the state, 16 reservoirs held 100 percent of conservation storage capacity (Figure 3). Additionally, 53 were at or above 90 percent full. Seven reservoirs [E.V. Spence (24 percent full), Greenbelt (17 percent full), J.B. Thomas (16 percent full), Mackenzie (9 percent full), O. C. Fisher (7 percent full), Palo Duro Reservoir (2 percent full), and White River (13 percent full)] remained below 30 percent full. Elephant Butte Reservoir (located in New Mexico) was at 4 percent full.

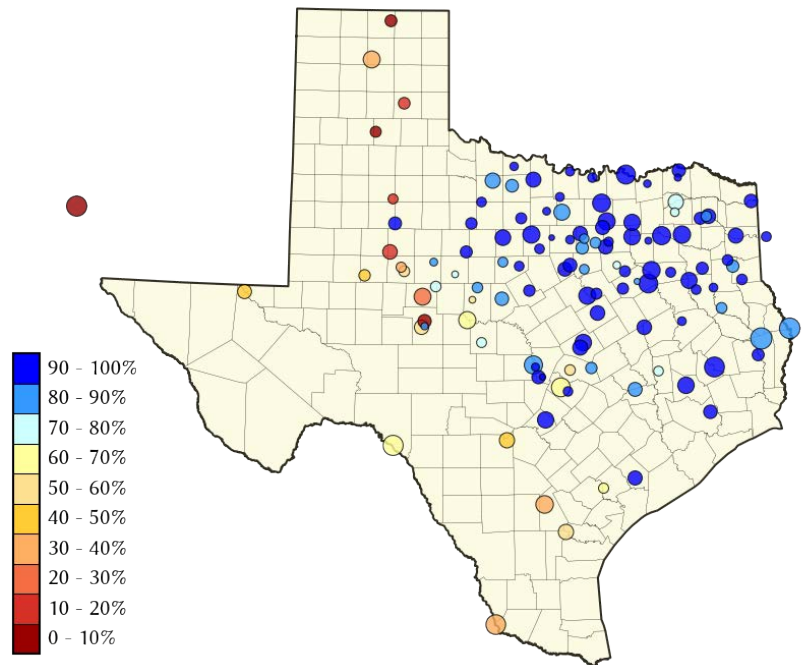


Figure 3: Reservoir conservation storage at end-October expressed as percent full (%)

*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.

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Storage capacity	Storage at end-October		Storage change from end-Sep 2020		Storage change from end-Oct 2019	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
Abilene, Lake	7,900	5,952	75	-384	-5	810	10
Alan Henry Reservoir	96,207	87,299	91	-1,761	-2	3,077	3
*Amistad Reservoir (Texas & Mexico)	3,275,532	1,213,357	37	25,812	1	-409,510	-13
*Amistad Reservoir (Texas)	1,840,849	1,192,227	65	70,748	4	-187,332	-10
Amon G Carter, Lake	19,266	18,496	96	-408	-2	608	3
Aquila Lake	43,243	40,305	93	-1,561	-4	3,752	9
Arlington, Lake	40,157	32,573	81	-1,217	-3	-5,560	-14
Arrowhead, Lake	230,359	230,359	100	1,736	1	27,980	12
Athens, Lake	29,503	29,503	100	0	0	1,815	6
*Austin, Lake	23,972	22,880	95	-123	0	383	2
B A Steinhagen Lake	69,186	64,087	93	98	0	779	1
Bardwell Lake	46,122	45,061	98	-1,061	-2	4,478	10
Belton Lake	435,225	429,662	99	-5,563	-1	20,689	5
Benbrook Lake	85,648	70,829	83	1,192	1	20,471	24
Bob Sandlin, Lake	192,417	186,155	97	-2,194	-1	524	0
Bonham, Lake	11,027	10,517	95	-510	-5	1,637	15
Brady Creek Reservoir	28,808	20,344	71	-760	-3	-4,362	-15
Bridgeport, Lake	366,236	329,543	90	-12,644	-3	20,499	6
*Brownwood, Lake	130,868	116,229	89	-4,097	-3	5,925	5
Buchanan, Lake	816,904	735,900	90	-23,096	-3	-38,168	-5
Caddo, Lake	29,898	29,898	100	0	0	no data	
Canyon Lake	378,781	344,357	91	-6,930	-2	-13,795	-4
Cedar Creek Reservoir in Trinity	644,686	626,545	97	-10,968	-2	43,613	7
Champion Creek Reservoir	41,580	24,903	60	-571	-1	-2,895	-7
Cherokee, Lake	40,094	39,044	97	-807	-2	1,517	4
Choke Canyon Reservoir	662,820	242,476	37	-10,133	-2	-68,628	-10
*Cisco, Lake	29,003	23,484	81	-476	-2	-2,006	-7
Coleman, Lake	38,075	33,490	88	-921	-2	173	0
Colorado City, Lake	31,040	19,947	64	-322	-1	-3,965	-13
*Coleta Creek Reservoir	30,758	11,761	38	-273	0	-2,183	-7
Conroe, Lake	410,988	375,972	91	-9,007	-2	913	0
Corpus Christi, Lake	256,062	142,346	56	-7,943	-3	-63,098	-25
Crook, Lake	9,195	9,195	100	0	0	849	9
Cypress Springs, Lake	66,756	64,511	97	-414	0	-2,245	-3
E. V. Spence Reservoir	517,272	121,611	24	-4,035	0	-20,071	-4
Eagle Mountain Lake	179,880	167,455	93	-2,921	-2	3,894	2
Elephant Butte Reservoir (Texas)	852,491	37,699	4	1,984	0	-144,482	-17
Elephant Butte Reservoir (Total Storage)	1,985,900	87,267	4	4,592	0	-334,450	-17
*Falcon Reservoir (Texas & Mexico)	2,646,817	550,742	21	-16,730	0	-63,954	-2
*Falcon Reservoir (Texas)	1,551,007	498,515	32	51,976	3	29,865	2
Fork Reservoir, Lake	605,061	553,714	92	-10,957	-2	-6,210	-1
Fort Phantom Hill, Lake	70,030	64,435	92	-2,166	-3	3,865	6
Georgetown, Lake	36,823	21,379	58	-685	-2	-2,499	-7
Gibbons Creek Reservoir	25,721	20,527	80	-705	-3	-351	-1
Graham, Lake	45,288	43,452	96	-1,097	-2	4,733	10
Granbury, Lake	132,949	132,704	100	489	0	5,702	4

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Name of lake or reservoir	Storage capacity	Storage at end- October		Storage change from end-Sep 2020		Storage change from end-Oct 2019	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
<i>Continued</i>							
Granger Lake	51,822	46,092	89	-1,461	-3	-4,832	-9
Grapevine Lake	163,064	160,056	98	-1,824	-1	3,784	2
Greenbelt Lake	59,968	10,327	17	-323	0	-1,664	-3
*Halbert, Lake	6,033	5,301	88	-17	0	383	6
Hords Creek Lake	8,109	4,660	57	-236	-3	-1,816	-22
Houston County Lake	17,113	17,010	99	-13	0	-103	0
Houston, Lake	130,147	125,123	96	-3,226	-2	-4,123	-3
Hubbard Creek Reservoir	313,298	286,449	91	-8,227	-3	9,242	3
Hubert H Moss Lake	24,058	23,350	97	-288	-1	-43	0
Inks, Lake	13,962	13,005	93	143	1	195	1
J. B. Thomas, Lake	199,931	32,026	16	-2,678	-1	-20,150	-10
Jacksonville, Lake	25,670	25,542	100	-128	0	983	4
Jim Chapman Lake (Cooper)	260,332	201,722	77	-11,676	-4	-29,835	-11
Joe Pool Lake	175,800	167,556	95	-4,406	-3	10,124	6
Kemp, Lake	245,307	207,322	85	2,214	1	4,512	2
Kickapoo, Lake	86,345	72,555	84	-2,409	-3	318	0
Lavon Lake	406,388	373,869	92	-13,122	-3	47,835	12
Leon, Lake	27,762	26,535	96	-895	-3	2,776	10
Lewisville Lake	563,228	551,944	98	-9,394	-2	26,133	5
Limestone, Lake	203,780	196,276	96	-6,388	-3	24,405	12
*Livingston, Lake	1,741,867	1,715,669	98	-26,198	-2	-26,198	-2
*Lost Creek Reservoir	11,950	11,346	95	-88	0	343	3
Lyndon B Johnson, Lake	115,249	111,371	97	612	1	1,344	1
Mackenzie Reservoir	46,450	4,300	9	-88	0	-1,104	-2
Marble Falls, Lake	6,901	6,869	100	76	1	44	1
Martin, Lake	75,726	64,451	85	-3,070	-4	2,503	3
Medina Lake	254,823	118,574	47	-10,265	-4	-96,224	-38
Meredith, Lake	500,000	181,382	36	-5,248	-1	-26,098	-5
Millers Creek Reservoir	26,768	26,768	100	0	0	3,487	13
*Mineral Wells, Lake	5,273	5,273	100	0	0	653	12
Monticello, Lake	34,740	28,355	82	-455	-1	69	0
Mountain Creek, Lake	22,850	22,850	100	0	0	0	0
Murvaul, Lake	38,285	35,945	94	-942	-2	-33	0
Nacogdoches, Lake	39,522	34,402	87	-1,115	-3	-1,175	-3
Nasworthy	9,615	8,257	86	61	1	37	0
Navarro Mills Lake	49,827	48,053	96	-1,679	-3	7,440	15
New Terrell City Lake	8,583	7,919	92	-117	-1	-286	-3
Nocona, Lake (Farmers Crk)	21,444	20,344	95	-355	-2	831	4
North Fork Buffalo Creek Reservoir	15,400	14,843	96	-32	0	3,170	21
O' the Pines, Lake	241,363	241,363	100	-20,354	-8	0	0
O. C. Fisher Lake	115,742	7,636	7	-345	0	-3,396	-3
*O. H. Ivie Reservoir	554,340	340,261	61	-8,452	-2	-44,795	-8
Oak Creek Reservoir	39,210	31,315	80	-954	-2	-2,967	-8

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	(acre-feet)		(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
<i>Continued</i>								
Palestine, Lake	367,303		360,638	98	-6,665	-2	26,343	7
Palo Duro Reservoir	61,066		1,214	2	-137	0	-2,755	-5
Palo Pinto, Lake	26,766		24,825	93	-1,312	-5	4,255	16
Pat Cleburne, Lake	26,008		23,028	89	-834	-3	1,212	5
*Pat Mayse Lake	113,683		113,683	100	0	0	3,641	3
Possum Kingdom Lake	538,139		532,076	99	-3,739	0	24,073	4
Proctor Lake	54,762		53,752	98	-1,010	-2	12,902	24
Ray Hubbard, Lake	439,559		410,827	93	-10,876	-2	27,744	6
Ray Roberts, Lake	788,167		771,267	98	-10,393	-1	-2,519	0
Red Bluff Reservoir	151,110		70,055	46	-2,366	-2	-19,496	-13
Richland-Chambers Reservoir	1,087,839		1,044,600	96	-31,279	-3	75,649	7
Sam Rayburn Reservoir	2,857,077		2,436,531	85	-61,127	-2	-170,659	-6
Somerville Lake	150,293		127,421	85	-3,553	-2	-19,848	-13
Squaw Creek, Lake	151,250		151,250	100	0	0	4,321	3
Stamford, Lake	51,570		51,570	100	0	0	7,870	15
Stillhouse Hollow Lake	227,771		227,771	100	0	0	13,567	6
Striker, Lake	16,934		16,934	100	0	0	0	0
Sweetwater, Lake	12,267		10,306	84	-265	-2	-1,329	-11
*Sulphur Springs, Lake	17,747		13,018	73	-951	-5	-4,054	-23
Tawakoni, Lake	871,685		823,069	94	-5,714	0	-357	0
Texana, Lake	159,566		152,745	96	-6,821	-4	32,089	20
Texoma, Lake (Texas & Oklahoma)	2,487,601		2,262,700	91	-45,722	-2	-249,502	-10
Texoma, Lake (Texas)	1,243,801		1,131,350	91	-22,860	-2	-112,451	-9
Toledo Bend Reservoir (Texas & Louisiana)	4,472,900		3,833,741	86	-35,229	0	447,575	10
Toledo Bend Reservoir (Texas)	2,236,450		1,914,820	86	-17,615	0	223,787	10
Travis, Lake	1,113,348		769,536	69	-21,269	-2	-179,111	-16
Twin Buttes Reservoir	182,454		99,337	54	-1,966	-1	-13,707	-8
Tyler, Lake	72,073		71,696	99	-329	0	8,803	12
Waco, Lake	189,418		182,680	96	-5,848	-3	23,387	12
Waxahachie, Lake	10,780		8,377	78	113	1	-819	-8
Weatherford, Lake	17,812		16,211	91	-584	-3	1,405	8
White River Lake	29,880		3,883	13	-335	-1	-1,952	-7
Whitney, Lake	553,344		503,154	91	-37,780	-7	71,635	13
Worth, Lake	24,419		19,868	81	-1,614	-7	781	3
Wright Patman Lake	135,069		135,069	100	-96,427	-71	0	0
STATEWIDE TOTAL								
STATEWIDE TOTAL	32,137,610		25,224,168	78	-495,405	-2	-439,123	-1

STREAMFLOW CONDITIONS

Much of the state had near normal streamflow (25–75th percentile, green shading in Figure 6) in October 2020. Above normal streamflow (76-90th percentile, light blue shading in Figure 6) was seen in the Upper Colorado, Upper Neches, and Lower Sabine river basins. Much above normal streamflow (>90th percentile, dark blue shading in Figure 6) was seen in the Lower Sabine river basin.

Below normal streamflow (10–24th percentile, orange shading in Figure 6) was recorded in the Upper and Lower Red, Mid and Lower Brazos, Trinity-San Jacinto, Upper and Lower Colorado, Upper Rio Grande, Lavaca-Guadalupe, Colorado-Lavaca, and Lower Brazos-Colorado river basins.

Some watersheds in the Upper Red, Upper and Lower Colorado, Upper Rio Grande, Nueces, Nueces-Rio Grande, San Antonio-Nueces, San Antonio, Guadalupe, and Lavaca river basins had much below normal streamflow (less than the 10th percentile, dark brown shading in Figure 6). Record low streamflow was seen in the Upper Brazos.

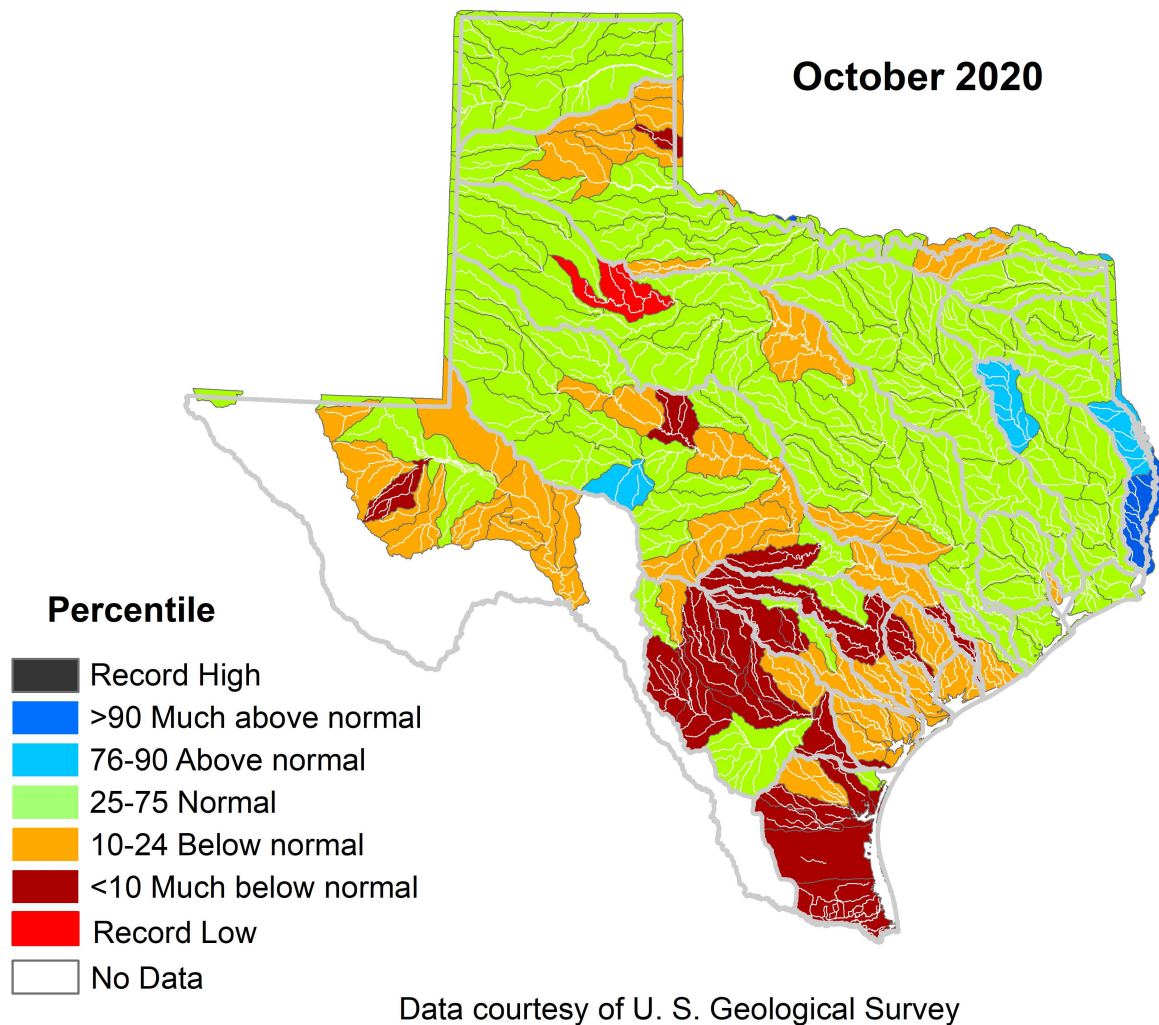


Figure 6: Runoff percentiles by the U.S. Geological Survey's Hydrologic Unit Code

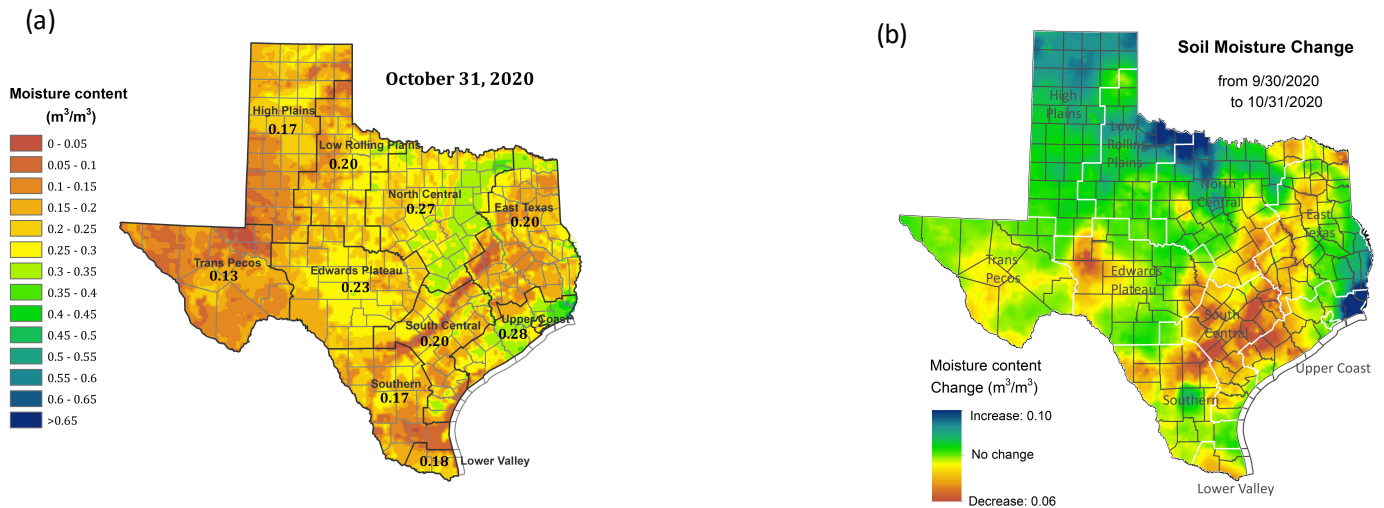
SOIL MOISTURE CONDITIONS

Root zone soil moisture at the end of October 2020 [Figure 7(a)] was moderate [> 0.20 cubic meters of water per bulk cubic meter soil (m^3/m^3)] in 7 of the 10 climate divisions. There were areas of low soil moisture [< 0.15 cubic meters of water per bulk cubic meter soil (m^3/m^3)] in portions of the Trans Pecos, southern and northeastern High Plains, northern and western Low Rolling Plains, northern and southern Southern, central, northeastern, and southern South Central and southwestern and northeastern East Texas, areas of eastern Edwards Plateau, and the northern and eastern boundaries of the Lower Valley climate divisions.

Soil moisture was high [>0.3 cubic meters of water per bulk cubic meter soil (m^3/m^3)] in small areas of northeastern Low Rolling Plains, northwestern and eastern North Central, areas of East Texas, northeastern and southern South Central, and the Upper Coast climate divisions [Figure 7(a)].

Compared to conditions at the end of September 2020, soil moisture content increased [green to blue shading in Figure 7(b)] in the northern and southeastern Trans Pecos, High Plains, Low Rolling Plains, northern and southern Edwards Plateau, much of the North Central, eastern East Texas, eastern Upper Coast, southern Southern, northern boundaries of the Lower Valley and the southern boundaries of South Central climate divisions.

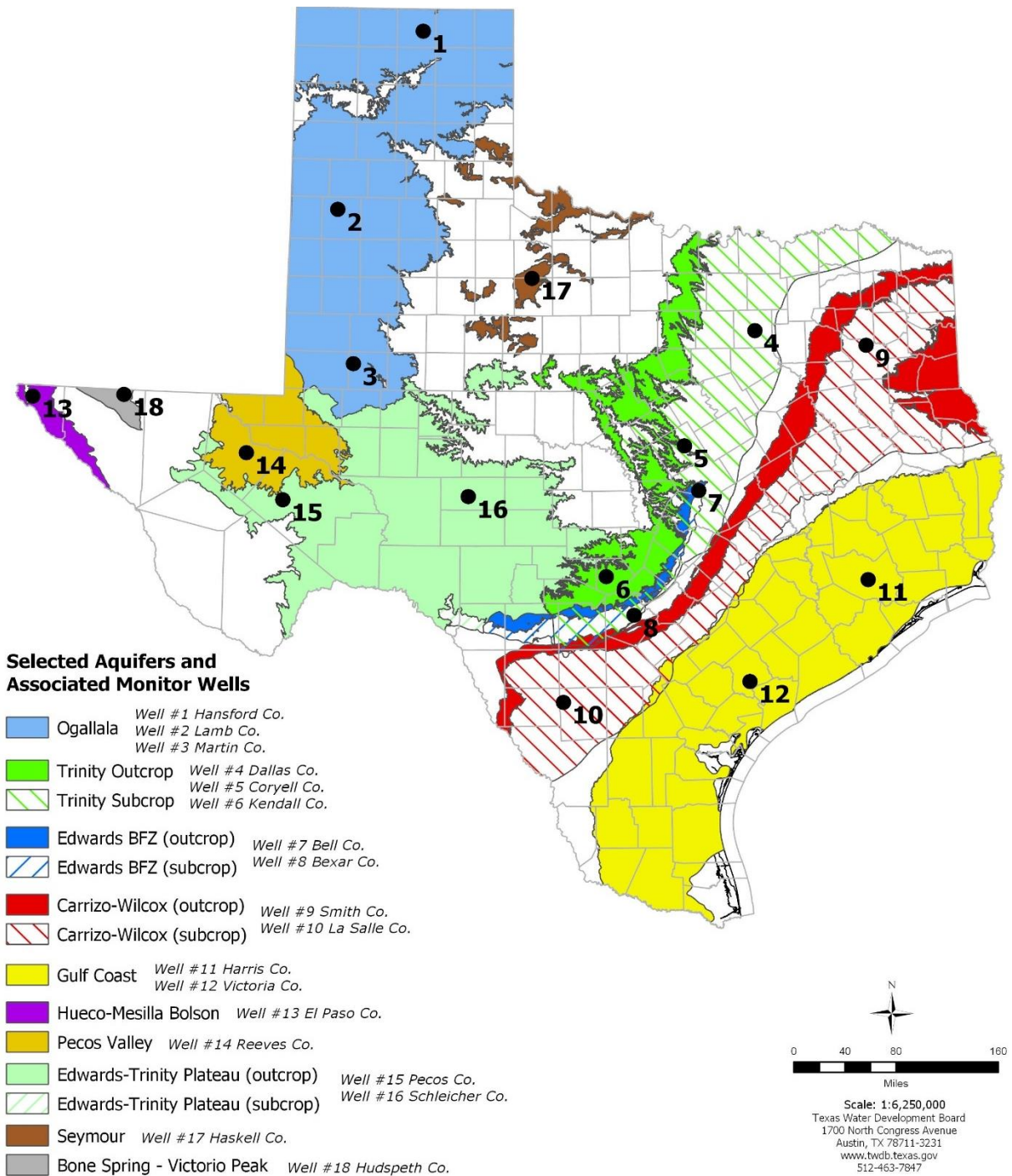
Soil moisture content decreased [yellow, orange, and brown shading in Figure 7(b)] in the central Trans Pecos, western Edwards Plateau, northern Southern, Lower Valley, South Central, western Upper Coast, southeastern, northeastern corner, and small area of central North Central, and western East Texas climate divisions.



Data from NASA Soil Moisture Active Passive (SMAP) Level 4 - Model - Value Added Version 4

Soil moisture content is shown as volume of water per unit volume of bulk soil. Root zone: 0 to 1 meter depth.

Figure 7: Root zone soil moisture conditions in October, 2020 (a) and the difference in root zone soil moisture between end-September 2020 and end-October 2020 (b)



October 2020 GROUNDWATER LEVELS IN OBSERVATION WELLS

Water-level measurements were available for 16 key monitoring wells in the state. Water levels rose in 7 monitoring wells since the beginning of October, ranging from an increase of 0.08 feet in the Bell County Edwards (Balcones Fault Zone) Aquifer well (#7 on map) to 3.53 feet in the Schleicher County Edwards-Trinity Plateau Aquifer (#16 on map). Water levels declined in 9 monitoring wells, ranging from a decline of -0.01 feet in the Hansford County Ogallala Aquifer well (#1 on map) to -2.68 feet in the La Salle County Carrizo-Wilcox Aquifer well (#10 on map). The J-17 well (#8 on map) in San Antonio recorded a water level of 70.80 feet below land surface or 660.20 feet above mean sea level. Water levels are 0.20 feet above the Stage I critical management level for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer.

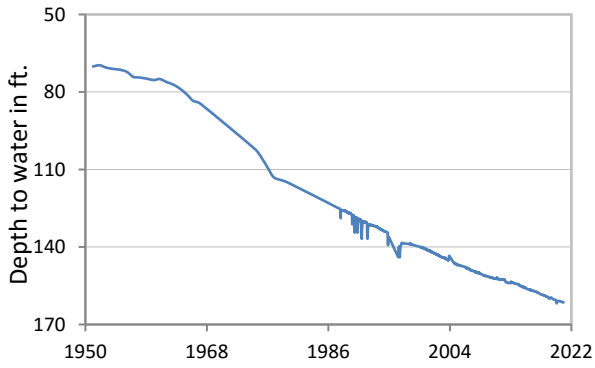
*Well numbers used in this publication on the aquifer map to indicate the monitoring well location (numbers 1 - 17) are different than the TWDB's seven-digit state well number.

Monitoring Well	October	September	Month Change	Year Change	Historical Change	First Measured
(1) Hansford 0354301	161.47	161.46	-0.01	0.34	-91.35	1951
(2) Lamb 1053602	NA	151.11	NA	NA	NA	1951
(3) Martin 2739903	144.31	144.03	-0.28	-0.26	-39.42	1964
(4) Dallas 3319101	489.93	489.26	-0.67	6.51	-267.93	1954
(5) Coryell 4035404	529.75	531.68	1.93	2.43	-237.75	1955
(6) Kendall 6802609	159.48	159.17	-0.31	-11.86	-99.48	1975
(7) Bell 5804816	124.54	124.62	0.08	-2.46	-1.03	2008
(8) Bexar 6837203	70.80	68.40	-2.40	-13.80	-24.16	1932
(9) Smith 3430907	436.61	436.97	0.36	0.93	-136.61	1977
(10) La Salle 7738103	516.91	514.23	-2.68	21.57	-263.84	2003
(11) Harris 6514409	189.44	189.61	0.17	4.47	-53.94*	1947**
(12) Victoria 8017502	33.62	33.14	-0.48	2.13	0.38	1958
(13) El Paso 4913301	296.38	296.08	-0.30	0.52	-64.48	1964
(14) Reeves 4644501	NA	165.55	NA	NA	NA	1952
(15) Pecos 5216802	220.45	218.65	-1.80	-14.31	26.43	1976
(16) Schleicher 5512134	285.79	289.32	3.53	-2.75	16.11	2003
(17) Haskell 2135748	44.81	44.92	0.11	0.55	-1.81	2002
(18) Hudspeth 4807516	156.29	158.95	2.66	-5.11	-52.37	1966

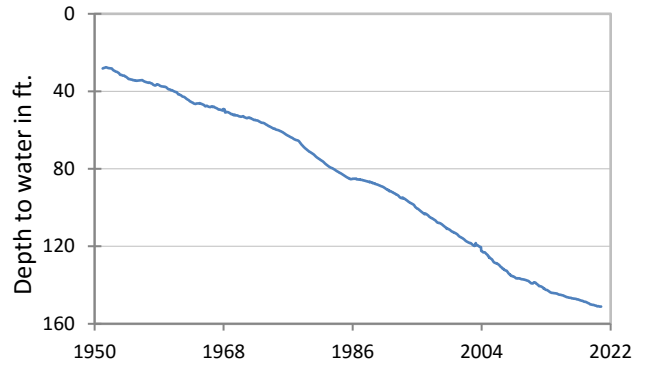
*Change since the original measurement of 135.5 feet below land surface in 1947 (**measurement not shown on the hydrograph)

October 2020 OBSERVATION WELL HYDROGRAPHS

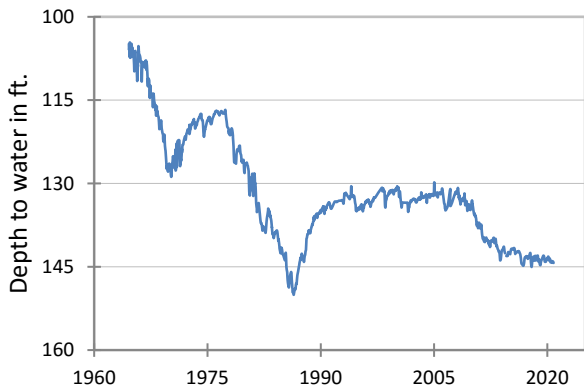
**(1) State Well #03-54-301
Near Spearman, Hansford County
Ogallala Aquifer**



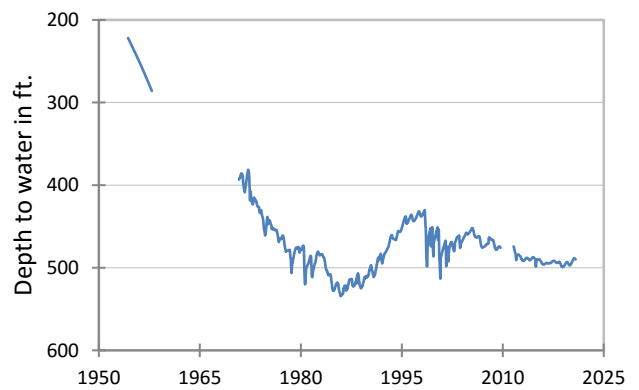
**(2) State Well #10-53-602
Near Earth, Lamb County
Ogallala Aquifer**



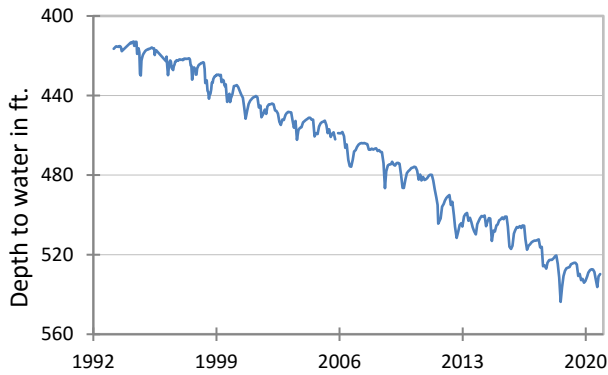
**(3) State Well #27-39-903
Northwest Martin County
Ogallala Aquifer**



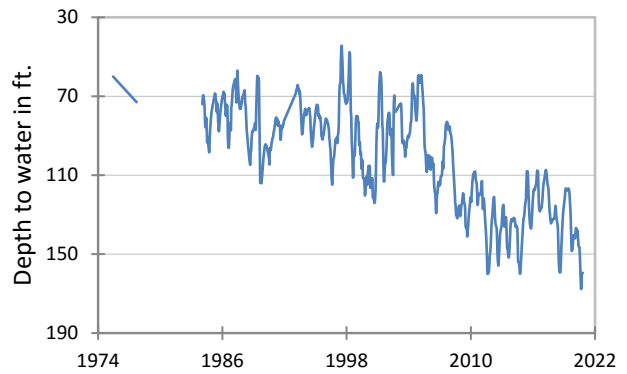
**(4) State Well #33-19-101
Southeast Dallas, Dallas County
Twin Mountains Formation-Trinity Aquifer**



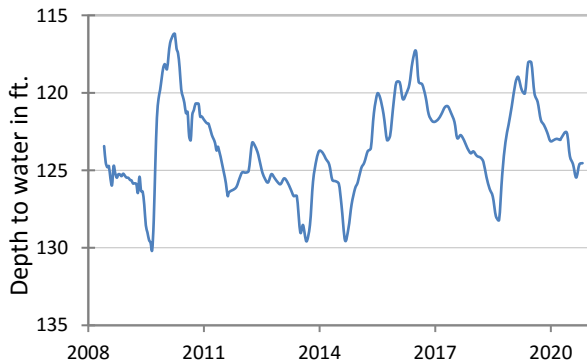
(5) State Well #40-35-404
Gatesville, Coryell County
Hosston Formation-Trinity Aquifer



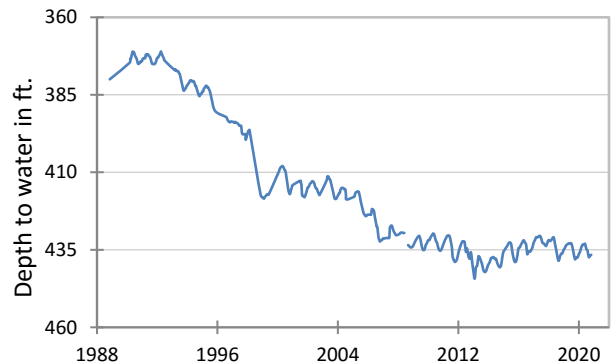
(6) State Well #68-02-609
Waring, Kendall County
Cow Creek Formation-Trinity Aquifer



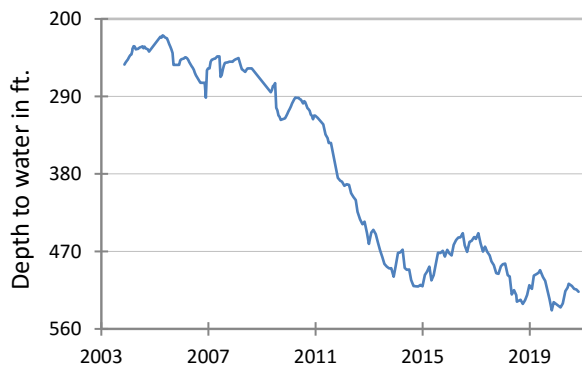
(7) State Well #58-04-816
Near Salado, Bell County
Edwards (Balcones Fault Zone) Aquifer



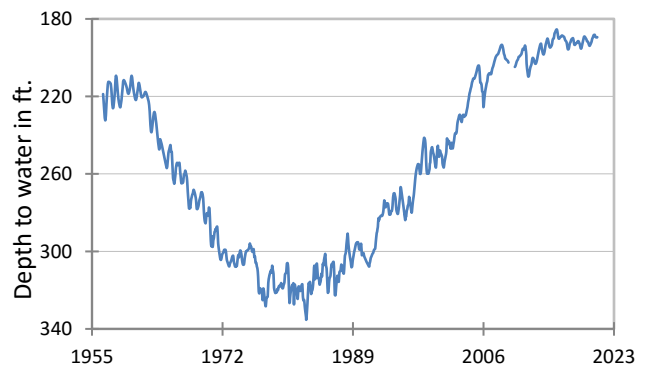
(9) State Well #34-30-907
Red Springs, Smith County
Carrizo-Wilcox Aquifer



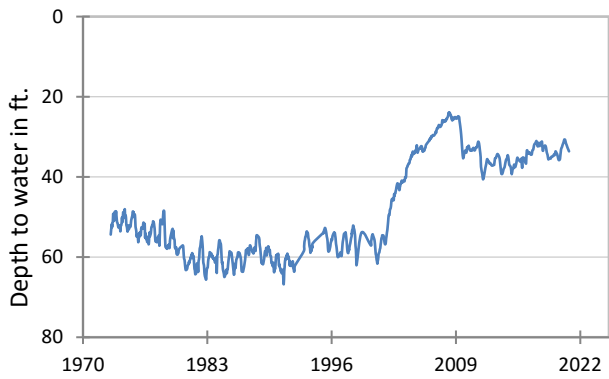
(10) State Well #77-38-103
Near Cotulla, La Salle County
Carrizo-Wilcox Aquifer



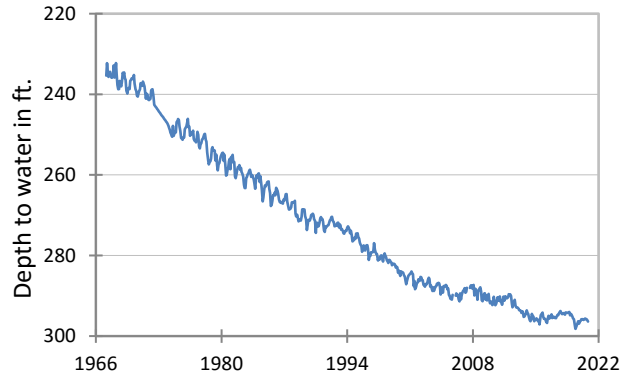
(11) State Well #65-14-409
Alief, Harris County
Evangeline Formation-Gulf Coast Aquifer



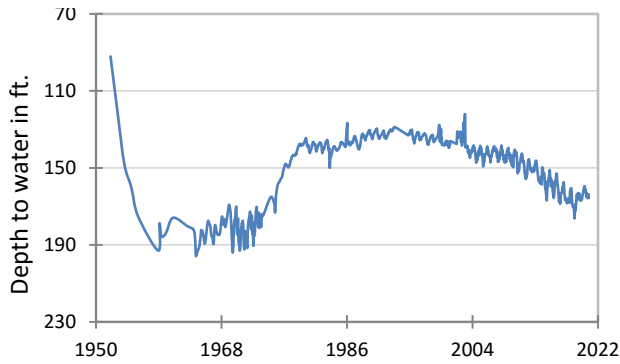
(12) State Well #80-17-502
Near Bloomington, Victoria County
Lissie Formation-Gulf Coast Aquifer



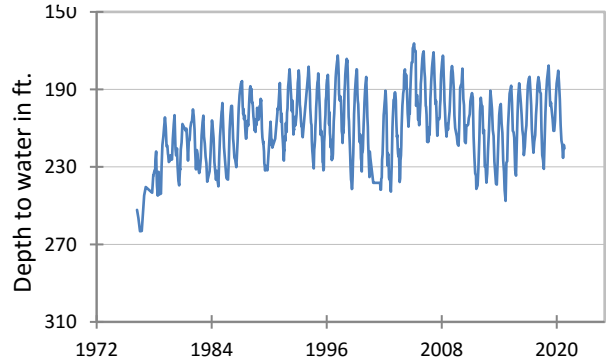
(13) State Well #49-13-301
El Paso, El Paso County
Hueco-Mesilla Bolson Aquifer



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



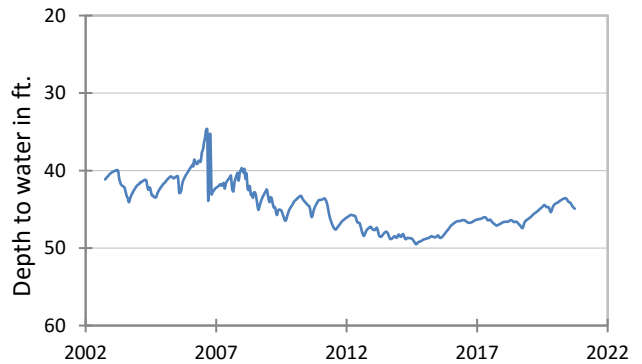
(15) State Well #52-16-802
Fort Stockton, Pecos County
Edwards-Trinity (Plateau) Aquifer



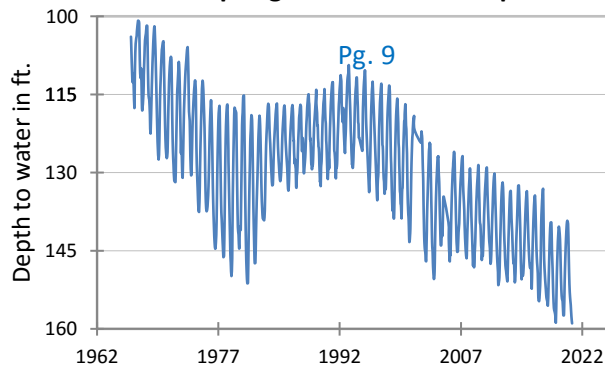
(16) State Well #55-12-134
Eldorado, Schleicher County
Trinity Aquifer



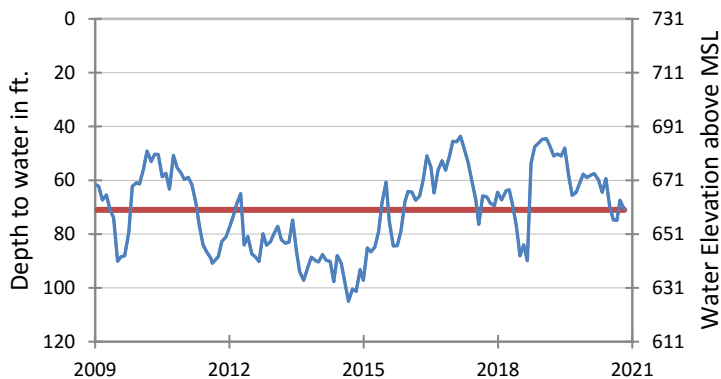
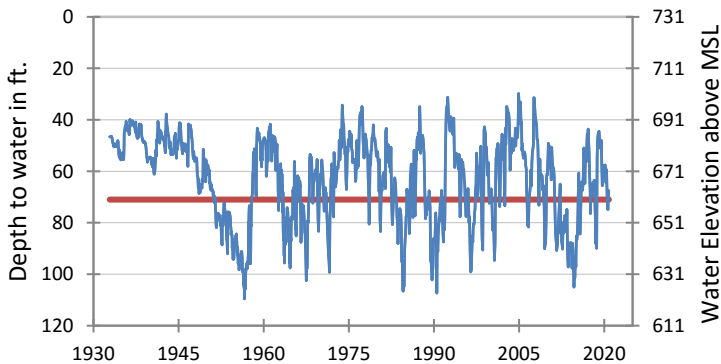
(17) State Well #21-35-748
Near O'Brien, Haskell County
Seymour Aquifer



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

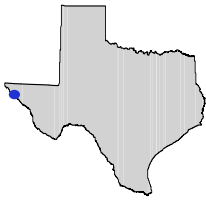


**(8) State Well #68-37-203 (J-17)
San Antonio, Bexar County
Edwards (Balcones Fault Zone) Aquifer**



The late October water-level measurement in this Edwards (Balcones Fault Zone) Aquifer well, elevation 731 feet above mean sea level, was 70.80 feet below land surface, or 660.20 feet above mean sea level. This was 2.40 feet below last month's measurement, 13.80 feet below last year's measurement and 24.16 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.



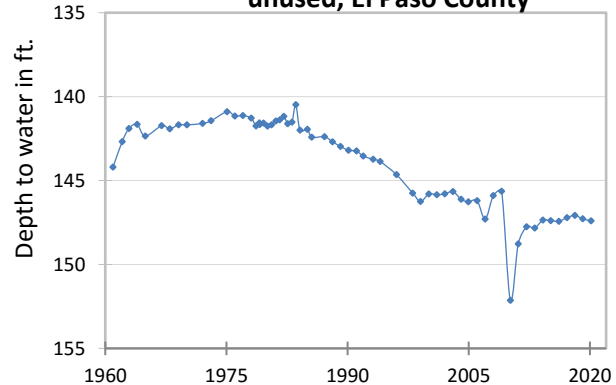
HYDROGRAPH OF THE MONTH

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

The Hueco-Mesilla Bolson Aquifer, located east and west of the Franklin Mountains in far West Texas, is recognized as a major aquifer. The aquifer is composed of basin-fill deposits of silt, sand, gravel, and clay in two basins, or bolsons: the Hueco Bolson, which has a maximum thickness of 9,000 feet, and the Mesilla Bolson, which has a maximum thickness of 2,000 feet. Although the Hueco and Mesilla bolsons share similar geology, very little water travels between them. The upper portion of the Hueco Bolson contains fresh to slightly saline water, ranging from less than 1,000 to 3,000 milligrams per liter of total dissolved solids. The Mesilla Bolson also contains fresh to saline water, ranging from less than 1,000 to 10,000 or more milligrams per liter of total dissolved solids. Its salinity typically increases to the south and in the shallower parts of the aquifer. In both aquifers, water-level declines have contributed to higher salinity.

Hueco-Mesilla Bolson Aquifer

Well #49-31-201, 400 feet deep
unused, El Paso County



The initial water-level measurement of 144.20 feet below land surface was taken in this well by the USGS in December of 1960. The USGS continued to take near-annual measurements in the well until the TWDB would take over in 1978. The period of record reveals a gradual decrease of 3.2 feet over 60 years with the lowest water level of 152.14 feet below land surface measured in February of 2010.



Far away (left), and close-up (right) images of well #49-31-201.