

# Texas Water Conditions Report

November 2023



## Water News:

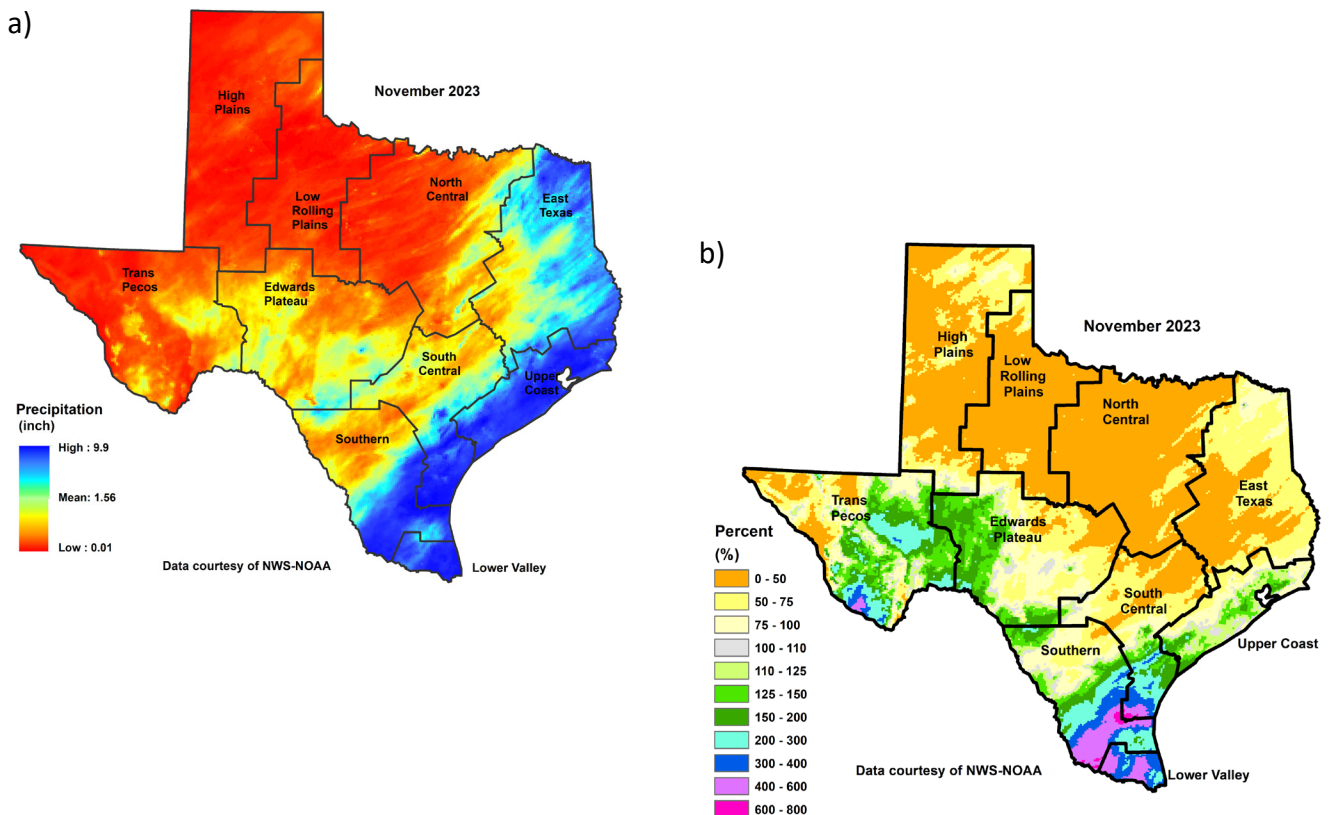
Coastal Science staff hosted an Estuary Science Exchange webinar featuring Dr. Ryan Bare with the Houston Advanced Research Center and his work to understand how the hydrologic flow regime, biogeochemical cycling, and physical characteristics of Lake Livingston influence the regulation of nutrient and sediment delivery from the upper to lower reaches of the Trinity. This and other webinar recordings in this series can be found here:

[https://www.twdb.texas.gov/surfacewater/bays/estuary\\_science/index.asp](https://www.twdb.texas.gov/surfacewater/bays/estuary_science/index.asp)

# RAINFALL

In November, much of the Trans Pecos, High Plains, Low Rolling Plains, North Central, Edwards Plateau, northern Southern, northern South Central, and western East Texas climate divisions received little to no rainfall [yellow, orange, and red shading, Figure 1(a)]. Where as, above average to high amounts of rainfall [light and dark blue shading, Figure 1(a)] were seen in the southern Edwards Plateau, northeastern North Central, northern and eastern East Texas, southern Southern, southern South Central, and the Upper Coast climate divisions.

Compared to historical data from 1991–2020, the High Plains, Low Rolling Plains, North Central, East Texas, central and eastern Edwards Plateau, northwestern Trans Pecos, northeastern Southern, and northern South Central received 0–75 percent of normal rainfall [yellow, orange shading, Figure 1(b)]. 125–200 percent of normal rainfall [green shading, Figure 1(b)] was received in central and eastern Trans Pecos, southern and western Edwards Plateau, central and northern Southern, southern South Central, and areas of the Upper Coast climate divisions. 200–400 percent of normal rainfall [light to dark blue shading, Figure 1(b)] was received in southern and eastern Trans Pecos, southern Southern, Lower Valley, and southern South Central climate divisions. The southern Trans Pecos, southern Southern, Lower Valley, and southern South Central climate divisions received 400–600 percent of normal [light purple shading, Figure 1(b)]. Southern portions of the Southern and southwestern corner of the South Central climate divisions had 600–800 percent of normal rainfall [dark pink shading, Figure 1(b)].



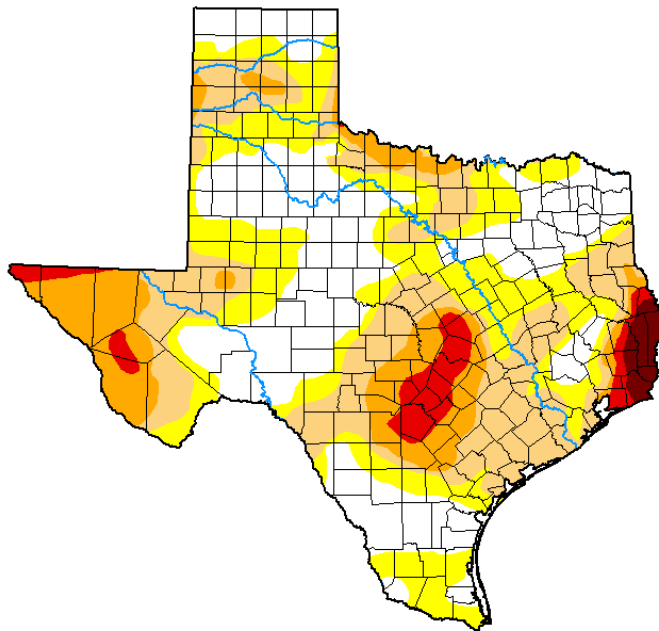
**Figure 1:** (a) Monthly accumulated rainfall, and (b) Percent of normal rainfall

# DROUGHT

At the end of November, 68.68% of the state was in the D0 (abnormally dry) through D4 (exceptional drought) categories (**Figure 2**). That is a decrease of 17.71 % from the end of October.

## U.S. Drought Monitor Texas

**November 28, 2023**  
(Released Thursday, Nov. 30, 2023)  
Valid 7 a.m. EST



**Intensity:**

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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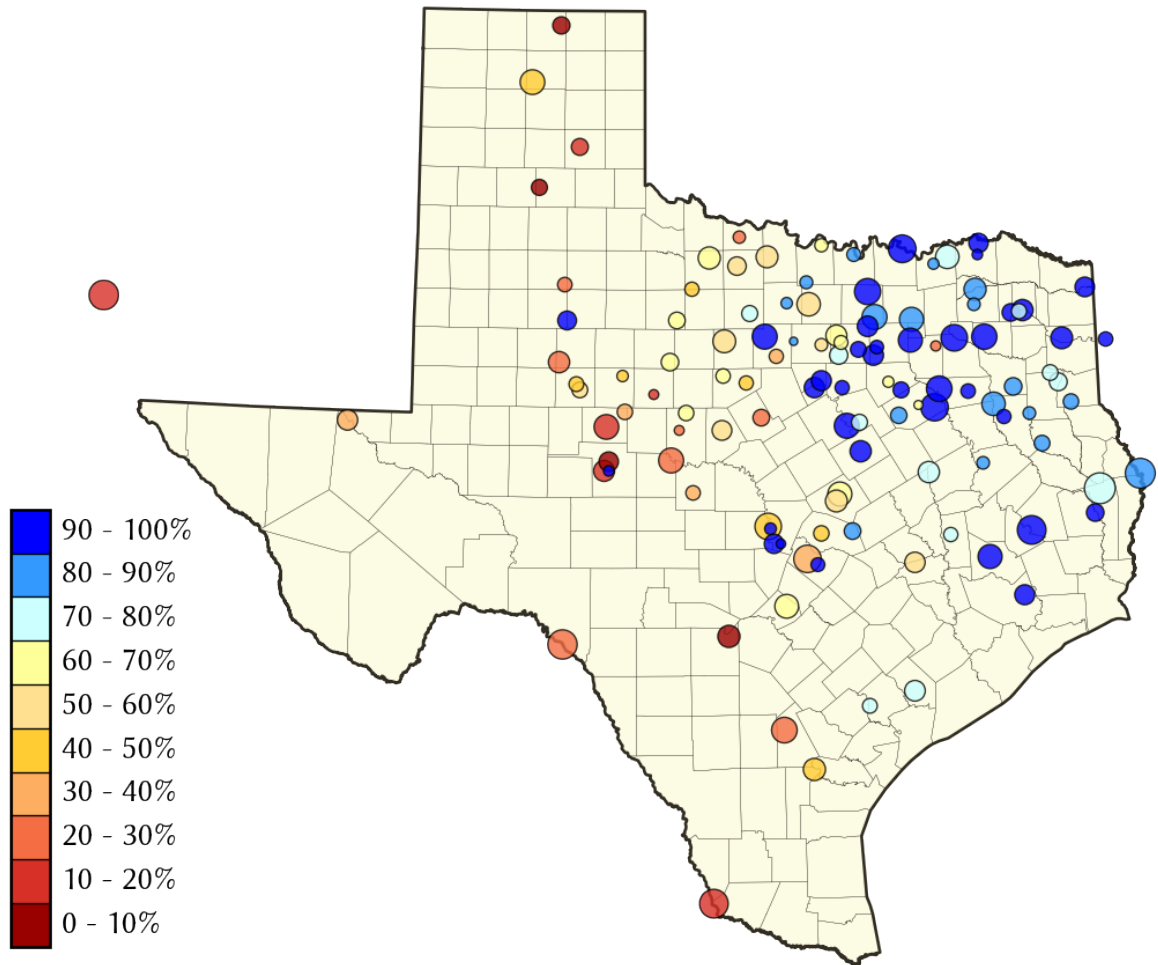


[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<u>2023-11-28</u>	31.32	68.68	42.84	18.38	5.94	1.51

**Figure 2.** The percentage of drought in Texas according to the U.S. Drought Monitor map as of November 28, 2023.

## RESERVOIR STORAGE



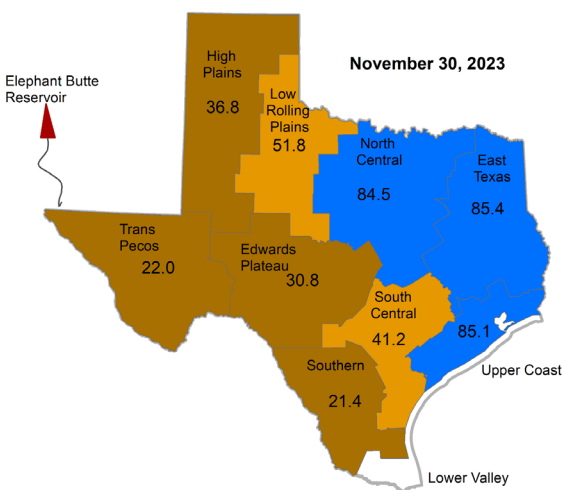
**Figure 3.** Reservoir conservation storage at end-November expressed as percent full (%)

Out of 119 reservoirs in the state, eight reservoirs held 100 percent conservation storage capacity. Twenty-eight reservoirs were at or above 90 percent full in November. Seventeen reservoirs remained below 30 percent full: Abilene (16.8 percent full), Amistad (26.8 percent full), Choke Canyon (25.1 percent full), E.V. Spence (16.7 percent full), Falcon (15.3 percent full), Greenbelt (10.4 percent full), Hords Creek (22.5 percent full), J.B. Thomas (22.4 percent full), Mackenzie (9.5 percent full), Medina Lake (3.6 percent full), North Fork Buffalo Creek Reservoir (28.8 percent full), O.H. Ivie (28.6 percent full), O.C. Fisher (2.1 percent full), Palo Duro Reservoir (5.2 percent full), Proctor (27.9 percent full), Twin Buttes (15.6 percent full), and the White River Lake (25.6 percent full). Elephant Butte Reservoir (New Mexico) was 18.9 percent full (Figure 3).

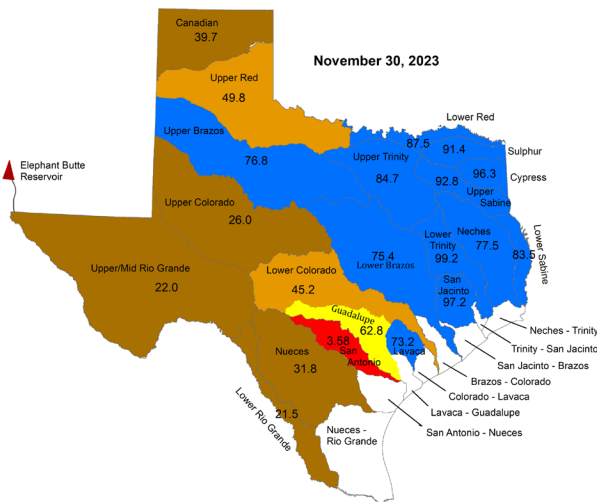
Reservoir conservation storage by climate division was at or above normal [storage  $\geq 70$  percent full, Figure 4(a)] for East Texas (85.4 percent full), North Central (84.5 percent full), and the Upper Coast (85.1 percent full) climate divisions. Conservation storage was moderately low (Figure 4(a)) for the Low Rolling Plains (51.8 percent full), and South Central (41.2 percent full) climate divisions. The High Plains (36.8 percent full), and Edwards Plateau (30.8 percent full), the Trans Pecos (22.0 percent full), and the Southern climate division (21.4 percent full) had severely low conservation storage (Figure 4(a)).

Combined conservation storage by river basin or sub-basin was exceptionally low [ $< 10$  percent full, red shading, Figure 4(b)] in the San Antonio river basin, and severely low [20–40 percent full, brown shading, Figure 4(b)] in the Upper/Mid Rio Grande, Lower Rio Grande, Nueces, Upper Colorado, and Canadian river basins. The Upper Red, and Lower Colorado river basins had moderately low conservation storage [40–60 percent full, orange shading, Figure 4(b)]. The Guadalupe river basin had abnormally low conservation storage [60-70 percent full, yellow shading, Figure 4(b)]. Normal to high conservation storage [ $> 70$  percent full, blue shading, Figure 4(b)] was observed in the Lower Red, Sulphur, Cypress, Upper and Lower Sabine, Upper and Lower Trinity, Upper and Lower Brazos, Neches, Lavaca, and San Jacinto river basins.

a) Regional Reservoir Storage Condition



b) Reservoir Storage Index\* (by Basins/Subbasins)



**Percent Full (%)**

<span style="color: red;">■</span> < 10 Exceptionally Low	<span style="color: brown;">■</span> 10 - 20 Extremely Low	<span style="color: blue;">■</span> 20 - 40 Severely Low
<span style="color: orange;">■</span> 40 - 60 Moderately Low	<span style="color: yellow;">■</span> 60 - 70 Abnormally Low	<span style="color: blue;">■</span> > 70 Normal to High

**Figure 4:** (a) Reservoir Storage Index\* by climate division, and (b) Reservoir Storage Index\* by basin/sub-basin.

\*Reservoir Storage Index is defined as the percent full of conservation storage capacity. Percent full is calculated as the combined conservation storage of all reservoirs in a climate region or a basin/subbasin, excluding dead pool storage.

## CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Storage capacity	Storage at end-November 2023		Storage change from end-Oct 2023		Storage change from end-Nov 2022	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
Abilene, Lake	7,900	1,328	16.8	-124	-1.6	-1,554	-19.7
Alan Henry Reservoir	96,207	87,402	90.8	-1,241	-1.3	15,348	16.0
*Amistad Reservoir (Texas & Mexico)	3,275,532	892,798	27.3	-51,307	-1.6	-582,945	-17.8
*Amistad Reservoir (Texas)	1,813,408	486,834	26.8	-56,350	-3.1	-374,425	-20.6
Amon G Carter, Lake	19,266	16,095	83.5	-309	-1.6	-487	-2.5
Aquilla Lake	43,243	32,237	74.5	-911	-2.1	3,821	8.8
Arlington, Lake	40,157	37,830	94.2	-2,327	-5.8	-2,327	-5.8
Arrowhead, Lake	230,359	124,985	54.3	-1,925	0.0	-29,686	-12.9
Athens, Lake	29,503	26,932	91.3	236	0.8	-652	-2.2
*Austin, Lake	23,972	23,050	96.2	293	1.2	-31	0.0
B A Steinhagen Lake	69,186	68,575	99.1	710	1.0	4,391	6.3
Bardwell Lake	43,856	43,856	100.0	0	0.0	2,209	5.0
Belton Lake	432,631	266,366	61.6	-449	0.0	-24,679	-5.7
Benbrook Lake	85,648	64,747	75.6	3,477	4.1	123	0.1
Bob Sandlin, Lake	192,417	181,545	94.3	691	0.4	-606	0.0
Bois d'Arc Lake	367,609	257,559	70.1	-9,487	-2.6	94,465	25.7
Bonham, Lake	11,027	9,658	87.6	-330	-3.0	-1,369	-12.4
Brady Creek Reservoir	28,808	10,644	36.9	-132	0.0	-2,440	-8.5
Bridgeport, Lake	372,183	211,661	56.9	-2,414	0.0	-62,487	-16.8
*Brownwood, Lake	130,868	78,535	60.0	-1,649	-1.3	-3,371	-2.6
Buchanan, Lake	866,694	389,142	44.9	3,765	0.4	-133,502	-15.4
Caddo, Lake	29,898	29,898	100.0	0	0.0	0	0
Canyon Lake	378,781	233,933	61.8	-5,928	-1.6	-72,600	-19.2
Cedar Creek Reservoir in Trinity	644,686	599,346	93.0	2,806	0.4	53,879	8.4
Champion Creek Reservoir	41,580	24,504	58.9	-283	0.0	-664	-1.6
Cherokee, Lake	40,094	31,505	78.6	485	1.2	-5,031	-12.5
Choke Canyon Reservoir	662,820	166,081	25.1	-4,038	0.0	-48,418	-7.3
*Cisco, Lake	29,003	17,825	61.5	-237	0.0	-3,044	-10.5
Coleman, Lake	38,075	23,486	61.7	-365	-0.9	-4,796	-12.6
Colorado City, Lake	31,040	23,610	76.1	173	0.6	-2,276	-7.3
*Coletto Creek Reservoir	30,758	15,075	49.0	-204	0.0	-2,314	-7.5
Conroe, Lake	417,577	403,199	96.6	-4,107	0.0	30,698	7.4
Corpus Christi, Lake	256,062	126,796	49.5	-4,741	-1.9	-75,568	-29.5
Crook, Lake	9,195	8,193	89.1	-91	0.0	-992	-10.8
Cypress Springs, Lake	66,756	64,257	96.3	476	0.7	1,862	2.8
E. V. Spence Reservoir	517,272	86,269	16.7	-186	0.0	-10,540	-2.0
Eagle Mountain Lake	179,880	123,735	68.8	3,996	2.2	-18,640	-10.4
Elephant Butte Reservoir (Texas)	852,491	161,125	18.9	16,755	2.0	84,224	9.9
Elephant Butte Reservoir (Total Storage)	1,985,900	372,975	18.8	38,784	2.0	194,964	9.8
*Falcon Reservoir (Texas & Mexico)	2,646,817	456,425	17.2	71,289	2.7	-24,523	0
*Falcon Reservoir (Texas)	1,562,367	239,806	15.3	73,016	4.7	20,765	1.3
Fork Reservoir, Lake	605,061	547,300	90.5	-8,397	-1.4	82,936	13.7
Fort Phantom Hill, Lake	70,030	48,882	69.8	-1,136	-1.6	1,090	1.6
Georgetown, Lake	38,005	17,604	46.3	432	1.1	-2,337	-6.1
Gibbons Creek Reservoir	25,721	18,469	71.8	-210	0.0	-379	-1.5
Graham, Lake	45,288	31,897	70.4	-831	-1.8	-3,691	-8.2
Granbury, Lake	132,949	129,389	97.3	-2,582	-1.9	14,344	10.8

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

Name of lake or reservoir	Storage capacity	Storage at end-November 2023		Storage change from end-Oct 2023		Storage change from end-Nov 2022		
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)	
<i>Continued</i>								
Granger Lake	51,822	42,805	82.6	1,775	3.4	-5,137	-9.9	
Grapevine Lake	163,064	154,627	94.8	-6,926	-4.2	-8,437	-5.2	
Greenbelt Lake	59,968	6,266	10.4	-209	0.0	-900	-1.5	
*Halbert, Lake	6,033	4,187	69.4	-125	-2.1	-1,246	-20.7	
Hords Creek Lake	8,109	1,825	22.5	-43	0.0	-685	-8.4	
Houston County Lake	17,113	15,065	88.0	376	2.2	-37	0.0	
Houston, Lake	132,318	131,747	99.6	-571	0.0	1,708	1.3	
Hubbard Creek Reservoir	313,298	162,363	51.8	-3,388	-1.1	-51,214	-16.3	
Hubert H Moss Lake	24,058	21,465	89.2	-235	0.0	153	0.6	
Inks, Lake	13,729	12,935	94.2	-39	0.0	-117	0.0	
J. B. Thomas, Lake	199,931	44,814	22.4	-227	0.0	-5,269	-2.6	
Jacksonville, Lake	25,670	23,542	91.7	67	0.3	44	0.2	
Jim Chapman Lake (Cooper)	258,723	227,428	87.9	-10,111	-3.9	23,515	9.1	
Joe Pool Lake	149,629	149,629	100.0	0	0.0	0	0.0	
Kemp, Lake	245,307	156,615	63.8	240	0.1	24,493	10.0	
Kickapoo, Lake	86,345	43,930	50.9	-821	0.0	-7,494	-8.7	
Lavon Lake	409,757	344,073	84.0	6,142	1.5	-578	0.0	
Leon, Lake	27,762	13,769	49.6	-334	-1.2	-3,155	-11.4	
Lewisville Lake	563,228	498,986	88.6	-6,902	-1.2	19,667	3.5	
Limestone, Lake	203,780	156,176	76.6	-3,040	-1.5	12,659	6.2	
*Livingston, Lake	1,603,504	1,592,660	99.3	239,182	14.9	-10,844	0.0	
*Lost Creek Reservoir	11,950	10,568	88.4	-110	0.0	74	0.6	
Lyndon B Johnson, Lake	112,778	111,109	98.5	192	0.2	-256	0.0	
Mackenzie Reservoir	46,450	4,402	9.5	-51	0.0	1,489	3.2	
Marble Falls, Lake	7,597	7,155	94.2	-144	-1.9	2,700	35.5	
Martin, Lake	75,726	55,358	73.1	-1,755	-2.3	-3,670	-4.8	
Medina Lake	254,823	9,146	3.6	-416	0.0	-7,867	-3.1	
Meredith, Lake	500,000	219,841	44.0	-3,109	0.0	65,128	13.0	
Millers Creek Reservoir	26,768	12,188	45.5	-255	0.0	-4,608	-17.2	
*Mineral Wells, Lake	5,273	4,416	83.7	-78	-1.5	226	4.3	
Monticello, Lake	34,740	27,431	79.0	218	0.6	-101	0.0	
Mountain Creek, Lake	22,850	22,850	100.0	0	0.0	0	0.0	
Murvaul, Lake	38,285	32,847	85.8	-97	0.0	-5,438	-14.2	
Nacogdoches, Lake	39,522	32,287	81.7	-623	-1.6	984	2.5	
Nasworthy	9,615	8,987	93.5	103	1.1	644	6.7	
Navarro Mills Lake	49,827	42,056	84.4	-751	-1.5	4,913	9.9	
New Terrell City Lake	8,583	2,450	28.5	-493	-5.7	-6,004	-70.0	
Nocona, Lake (Farmers Crk)	21,444	14,569	67.9	-392	-1.8	-1,629	-7.6	
North Fork Buffalo Creek Reservoir	15,400	4,438	28.8	-115	0.0	-2,535	-16.5	
O' the Pines, Lake	241,363	241,363	100.0	0	0.0	3,514	1.5	
O. C. Fisher Lake	115,742	2,376	2.1	-54	0.0	-1,365	-1.2	
*O. H. Ivie Reservoir	554,340	158,419	28.6	-4,894	0.0	-63,670	-11.5	
Oak Creek Reservoir	39,210	13,471	34.4	-315	0.0	-5,887	-15.0	

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Name of lake or reservoir	Storage capacity	Storage at end-November 2023		Storage change from end-Oct 2023		Storage change from end-Nov 2022		
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)	
<i>Continued</i>								
Palestine, Lake	367,303	316,301	86.1	-632	0.0	-6,994	-1.9	
Palo Duro Reservoir	61,066	3,165	5.2	-367	0.0	2,946	4.8	
Palo Pinto, Lake	26,766	9,907	37.0	-195	0.0	-5,384	-20.1	
Pat Cleburne, Lake	26,008	26,008	100.0	0	0.0	11,609	44.6	
*Pat Mayse Lake	113,683	103,993	91.5	-1,903	-1.7	-5,659	-5.0	
Possum Kingdom Lake	538,139	509,547	94.7	11,396	2.1	67,963	12.6	
Proctor Lake	54,762	15,285	27.9	-153	0.0	-8,513	-15.5	
Ray Hubbard, Lake	439,559	400,849	91.2	2,581	0.6	-28,582	-6.5	
Ray Roberts, Lake	788,167	741,138	94.0	-9,323	-1.2	-2,189	0.0	
Red Bluff Reservoir	151,110	59,756	39.5	no data		-33,842	-22.4	
Richland-Chambers Reservoir	1,099,417	995,163	90.5	-2,097	0.0	86,617	7.9	
Sam Rayburn Reservoir	2,857,077	2,155,388	75.4	-69,804	-2.4	-39,929	-1.4	
Somerville Lake	150,293	89,787	59.7	-1,914	-1.3	-6,344	-4.2	
Squaw Creek, Lake	151,250	151,250	100.0	0	0.0	0	0.0	
Stamford, Lake	51,570	35,966	69.7	-954	-1.8	2,828	5.5	
Stillhouse Hollow Lake	229,796	137,424	59.8	-3,587	-1.6	-32,028	-13.9	
Striker, Lake	16,934	13,939	82.3	255	1.5	-1,986	-11.7	
Sweetwater, Lake	12,267	5,880	47.9	-100	0.0	-1,614	-13.2	
*Sulphur Springs, Lake	17,747	15,061	84.9	-2,686	-15.1	-2,686	-15.1	
Tawakoni, Lake	871,685	847,152	97.2	-9,825	-1.1	36,157	4.1	
Texana, Lake	158,975	116,420	73.2	-167	0.0	-5,354	-3.4	
Texoma, Lake (Texas & Oklahoma)	2,487,601	2,303,606	92.6	20,639	0.8	-77,981	-3.1	
Texoma, Lake (Texas)	1,243,801	1,151,802	92.6	10,319	0.8	-38,991	-3.1	
Toledo Bend Reservoir (Texas & Louisiana)	4,472,900	3,741,968	83.7	-46,975	-1.1	-82,177	-1.8	
Toledo Bend Reservoir (Texas)	2,236,450	1,868,934	83.6	-23,488	-1.1	-41,088	-1.8	
Travis, Lake	1,098,044	420,363	38.3	-3,967	0.0	-89,086	-8.1	
Twin Buttes Reservoir	182,454	28,497	15.6	-1,088	0.0	-24,345	-13.3	
Tyler, Lake	72,073	59,585	82.7	-335	0.0	-126	0.0	
Waco, Lake	189,418	186,594	98.5	-2,824	-1.5	76,062	40.2	
Waxahachie, Lake	11,060	7,199	65.1	-103	0.0	-2,073	-18.7	
Weatherford, Lake	17,812	10,628	59.7	0	0.0	-416	-2.3	
White River Lake	29,880	7,643	25.6	-455	-1.5	3,303	11.1	
Whitney, Lake	564,808	535,180	94.8	12,624	2.2	112,042	19.8	
Worth, Lake	24,419	15,215	62.3	-5,013	-20.5	-1,890	-7.7	
Wright Patman Lake	122,593	122,593	100.0	-12,476	-10.2	0	0.0	
<b>STATEWIDE TOTAL</b>								
<b>STATEWIDE TOTAL</b>	<b>32,382,151</b>	<b>21,597,411</b>	<b>66.7</b>	<b>83,037</b>	<b>0.3</b>	<b>-482,877</b>	<b>-1.5</b>	

\*Total volume below elevation of conservation pool top is used as the conservation storage capacity, because the dead pool storage is unknown.

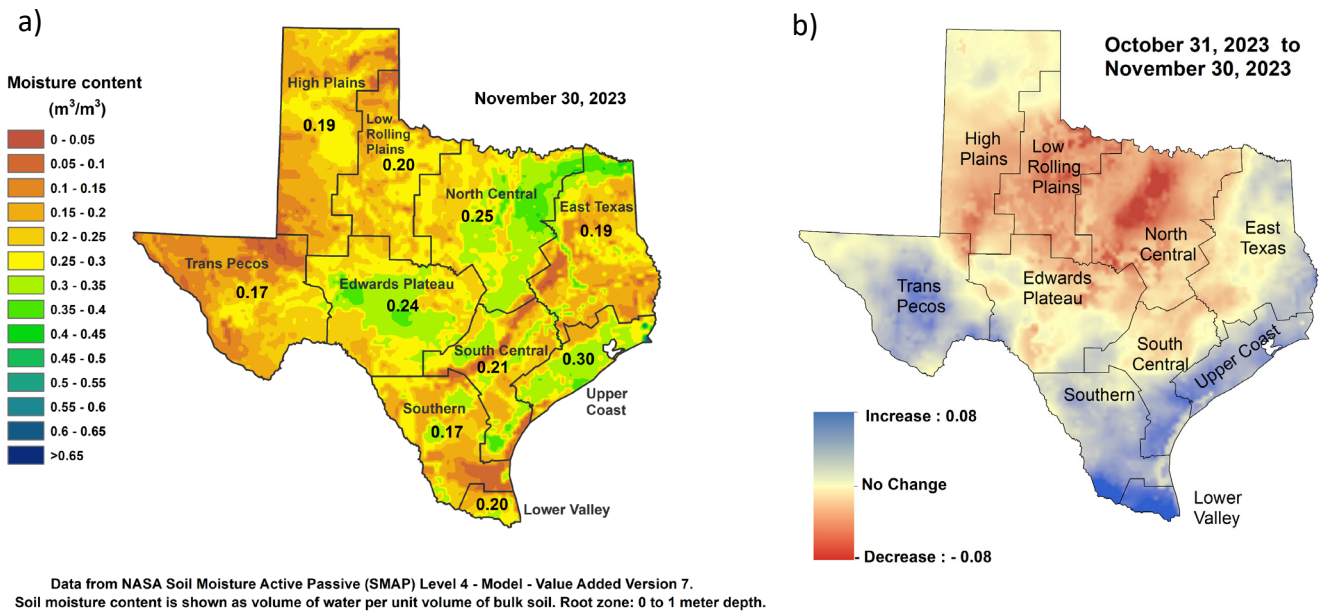
\*\*Monthly and yearly changes do not include reservoirs that did not have data in the last month or last year, respectively.



## SOIL MOISTURE

At the end of November 2023, root zone soil moisture was low [yellow, orange, Figure 5(a)] across much of the state. Areas of more severe dryness [brown shading, Figure 5(a)] were in northeastern and southern High Plains, northern Low Rolling Hills, areas of the Trans Pecos, northeastern and southern Southern, northern and southeastern South Central, and southern and western East Texas climate divisions. Average soil moisture [green shading, Figure 5(a)] was seen in the central and eastern North Central, northern and portions of western East Texas, central Edwards Plateau, northern and southern South Central, central, northeastern, and southern Southern, and much of the Upper coast climate divisions.

Compared to conditions at the end of October 2023, soil moisture increased [blue shading in Figure 5(b)] in central Trans Pecos, Southern, Lower Valley, southern Southern, the Upper Coast, and portions of eastern East Texas climate divisions. Soil moisture decreased [red shading in Figure 5(b)] in central and southern High Plains, Low Rolling Plains, North Central, northeastern Edwards Plateau, northern South Central, and western East Texas climate divisions.



Data from NASA Soil Moisture Active Passive (SMAP) Level 4 - Model - Value Added Version 7. Soil moisture content is shown as volume of water per unit volume of bulk soil. Root zone: 0 to 1 meter depth.

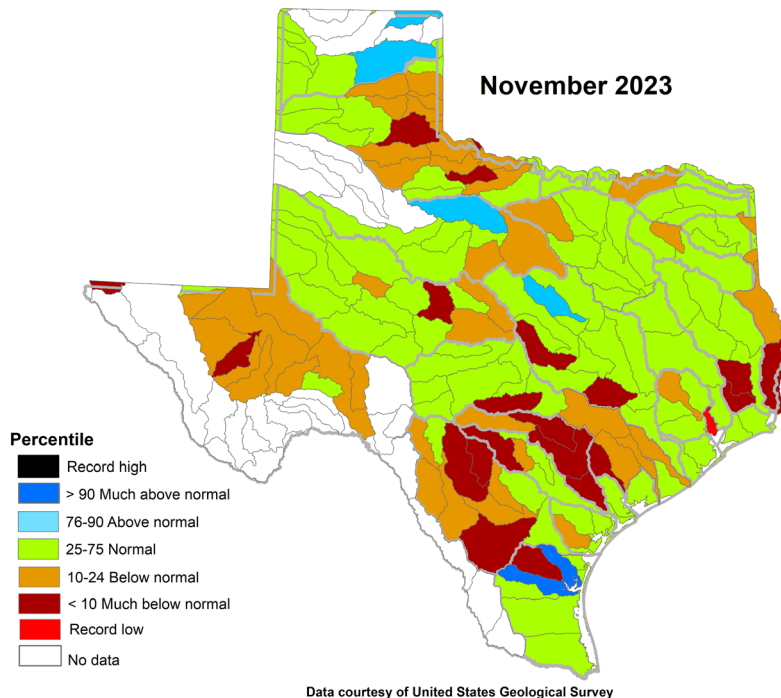
**Figure 5:** (a) Root zone soil moisture conditions in November 2023 and (b) the difference in root zone soil moisture between end-October 2023 and end-November 2023.

## STREAMFLOW CONDITIONS

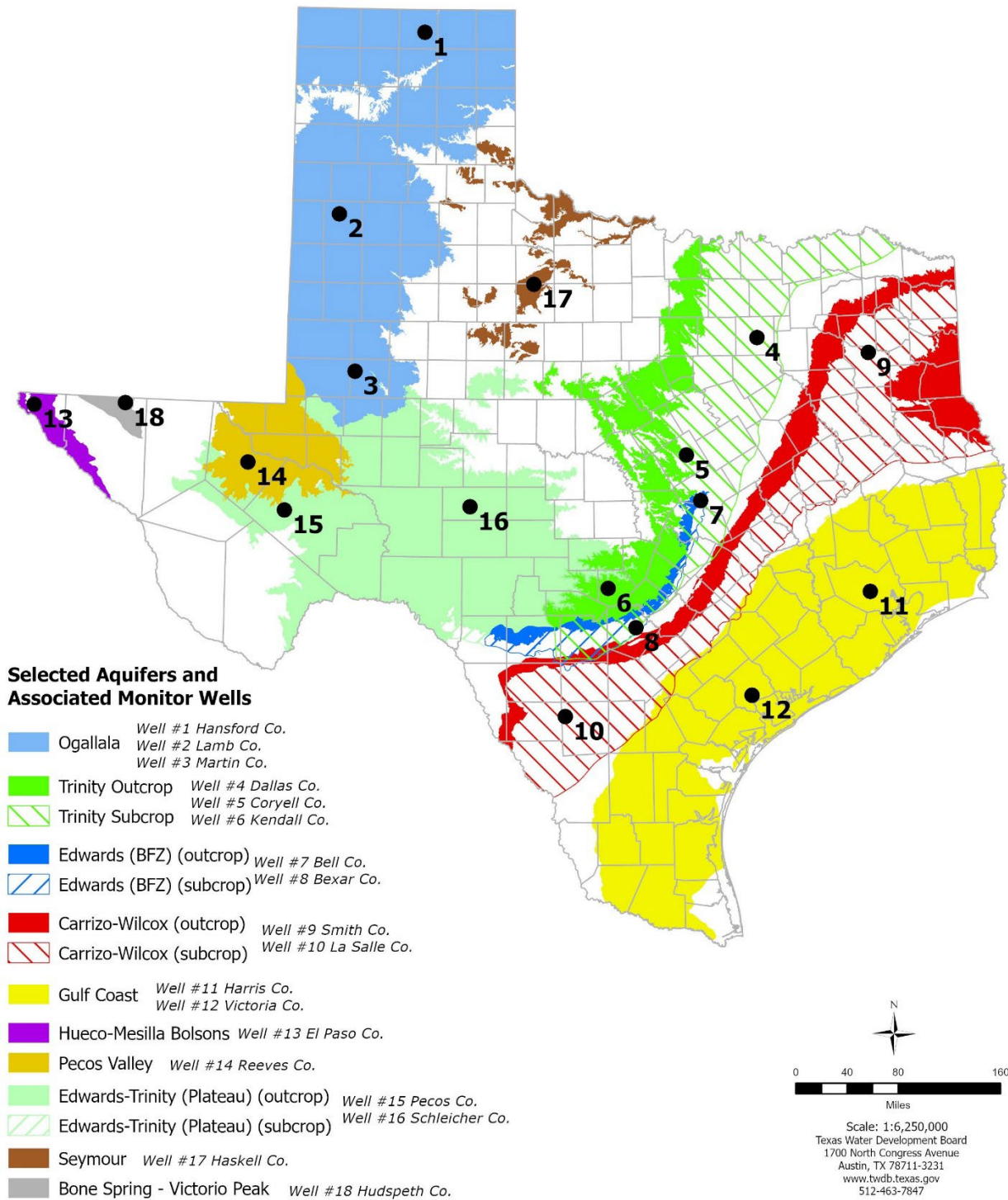
Normal streamflow (25–75<sup>th</sup> percentile, green shading, Figure 6) was recorded in parts of the Panhandle, Northern, Eastern, and Southern regions of Texas this month. Above normal streamflow (76–90<sup>th</sup> percentile, light blue shading, Figure 6) was seen The Canadian (Lower Beaver and Middle Canadian-Spring watersheds), and Brazos (Middle Brazos-Millers and North Bosque) river basins. Much above normal streamflow (>90<sup>th</sup> percentile, dark blue shading, Figure 6) was seen in the Nueces-Guadalupe (Baffin Bay watershed) river basin.

Below normal streamflow (10–24<sup>th</sup> percentile, orange shading, Figure 6) was recorded in the Upper and Lower Red (Bois D Arc-Island watershed), Brazos (Hubbard and Middle Brazos-Palo Pinto watersheds), Trinity (Upper West Fork Trinity watershed), Colorado (Beals, Middle Colorado, Lower Colorado, Lower Colorado-Cummins, and Pecan Bayou watersheds), Upper Sabine (Lake Fork watershed), Lower Sabine (Toledo Bend reservoir watershed), San Jacinto (West Fork watershed), Cypress (Cross Bayou watershed), Brazos-Colorado (San Bernard watershed), Lavaca (Navidad watershed), Pecos, Nueces, Upper San Antonio, Upper Guadalupe, and San Antonio-Nueces (Aransas watershed) river basins. Much below normal stream flow (< 10<sup>th</sup> percentile, dark red shading, Figure 6) was seen in the Upper Red (Lower Prairie Dog Town Fork Red, and Southern Beaver watersheds), Middle Colorado (Elm watershed), Lower Colorado (Lampasas watershed), Guadalupe, San Antonio (Medina watershed), Nueces (Upper Frio, Middle Nueces, and Hondo watersheds), Pecos (Toyah watershed), Lower Sabine, Nueces-Rio Grande (San Fernando watershed) river basins.

A record low (bright red shading, Figure 6) was recorded in the Trinity-San Jacinto (North Galveston Bay watershed) river basin.



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



## NOVEMBER 2023 GROUNDWATER LEVELS IN MONITORING WELLS

Water level measurements were available for 17 key monitoring wells in the state. The recorder in one well (#9 on map) was offline or the well experienced issues during the reporting period. Water levels rose in eleven monitoring wells since the beginning of November, with an increase of 0.21 feet in the Haskell County Seymour Aquifer well (#17 on map) to 5.92 feet in the Kendall County Trinity Aquifer well (#6 on map). Water levels declined in three monitoring wells, ranging from a decline of -0.01 feet in the Martin County Ogallala Aquifer (#3 on map) to -0.38 feet in the Harris County Gulf Coast Aquifer well (#11 on map). Water level changes were not available for three wells that were offline in October. The J-17 well (#8 on map) in San Antonio recorded a water level of 94.40 feet below land surface or 636.60 feet above mean sea level. Water levels are 3.40 feet below the Stage 3 critical management levels for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer. The Edwards Aquifer Authority declared Stage 3 water restrictions effective November 1, 2023, as a result of well J-17 water levels and area spring flow levels.

\* Well numbers used in this publication on the aquifer map to indicate the monitoring well locations (numbers 1 to 18) are different than the TWDB's seven-digit state well number.

Monitoring Well	November (depth to water, feet)	October (depth to water, feet)	Month Change	Year Change	Historical Change*	First Measured (year)
(1) Hansford 0354301	164.65	164.98	0.33	-1.68	-94.53	1951
(2) Lamb 1053602	154.52	154.46	-0.06	-1.14	-126.35	1951
(3) Martin 2739903	145.99	145.98	-0.01	-0.11	-41.10	1964
(4) Dallas 3319101	503.40	NA	NA	NA	-281.40	1954
(5) Coryell 4035404	546.89	548.01	1.12	-0.84	-254.89	1955**
(6) Kendall 6802609	165.86	171.78	5.92	2.13	-105.86	1975
(7) Bell 5804816	127.32	128.44	1.12	-1.91	-3.81	2008
(8) Bexar 6837203	94.40	95.10	0.70	-1.50	-47.76	1932
(9) Smith 3430907	NA	NA	NA	NA	-140.39	1977**
(10) La Salle 7738103	540.04	543.95	3.91	-9.77	-286.97	2003
(11) Harris 6514409	199.59	199.21	-0.38	-5.67	-64.09*	1947**
(12) Victoria 8017502	33.22	34.14	0.92	0.75	0.78	1958**
(13) El Paso 4913301	298.30	299.44	1.14	1.75	-66.40	1964**
(14) Reeves 4644501	158.49	NA	NA	-0.81	-66.40	1952
(15) Pecos 5216802	206.17	NA	NA	-9.90	40.71	1976
(16) Schleicher 5512134	317.05	320.43	3.38	-5.35	-15.15	2003
(17) Haskell 2135748	46.98	47.19	0.21	-0.15	-3.98	2002
(18) Hudspeth 4807516	148.66	150.91	2.25	0.00	-44.74	1966

\*Change since the original measurement taken on the date indicated in the last column. The historical change shown for recorder wells #9 is based off its most recent water level record from April 2023.

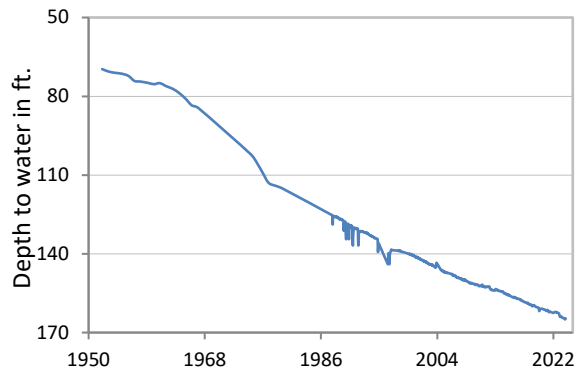
\*\* Measurement not shown on the hydrograph.

NA (not available)

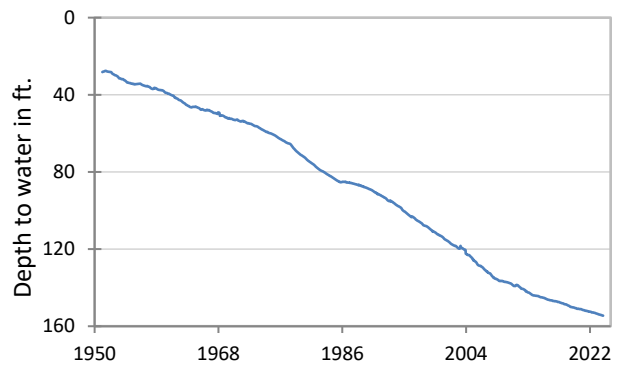
All data are provisional and subject to revision.

**OCTOBER 2023 MONITORING WELL HYDROGRAPHS**

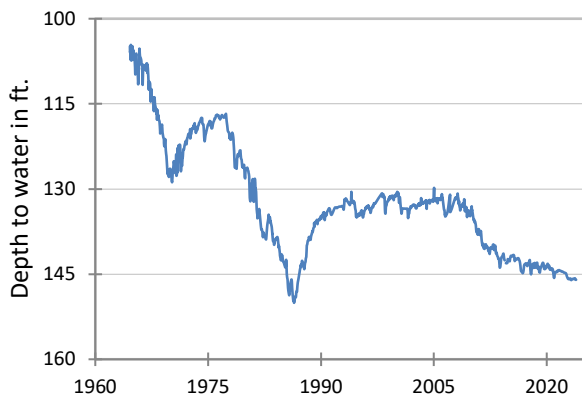
**(1) State Well #03-54-301  
Near Spearman, Hansford County  
Ogallala Aquifer**



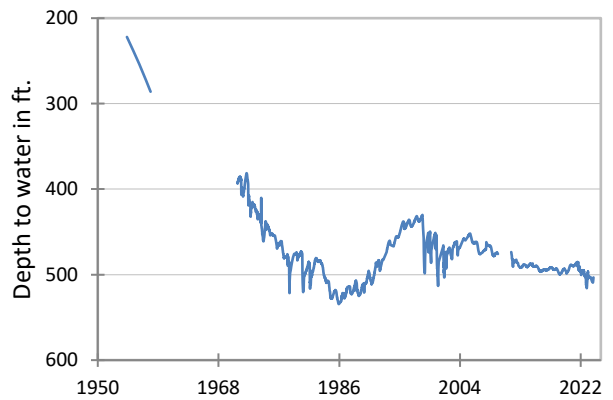
**(2) State Well #10-53-602  
Near Earth, Lamb County  
Ogallala Aquifer**



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

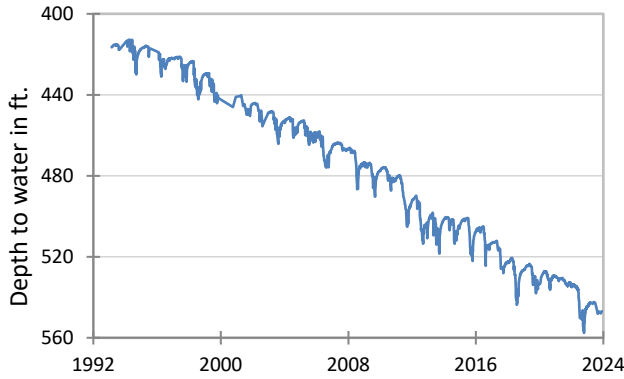


**\*(4) State Well #33-19-101  
Southeast Dallas, Dallas County  
Twin Mountains Formation-Trinity Aquifer**

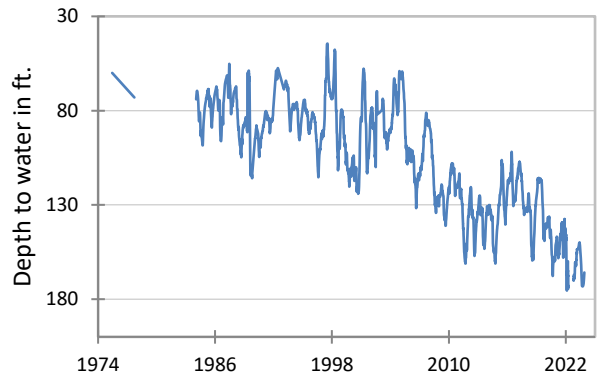


\*Previous data for recorder well #4 is currently under review and subject to revision.

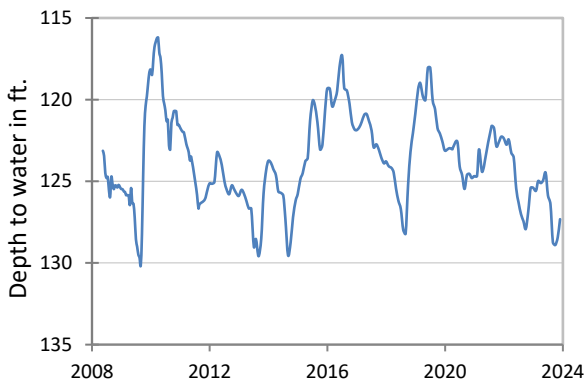
**(5) State Well #40-35-404**  
**Gatesville, Coryell County**  
**Hosston Formation-Trinity Aquifer**



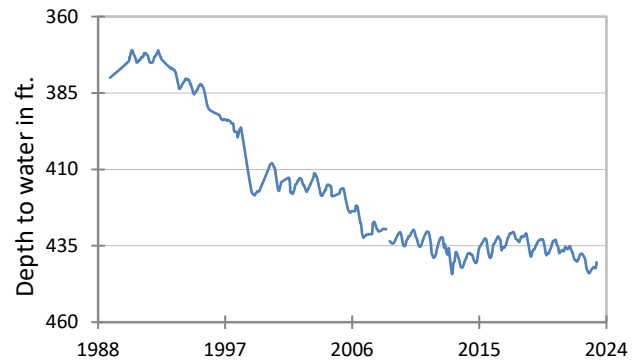
**(6) State Well #68-02-609**  
**Waring, Kendall County**  
**Travis Peak Formation-Trinity Aquifer**



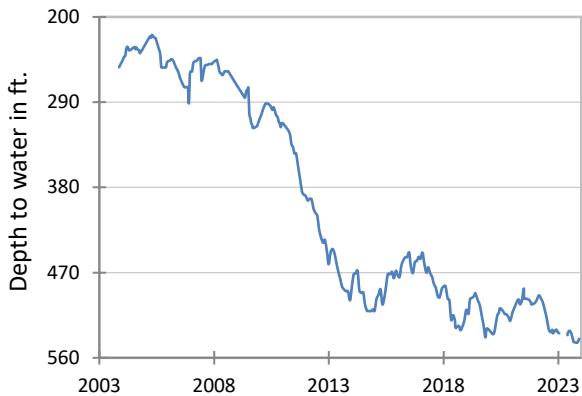
**(7) State Well #58-04-816**  
**Near Salado, Bell County**  
**Edwards (Balcones Fault Zone) Aquifer**



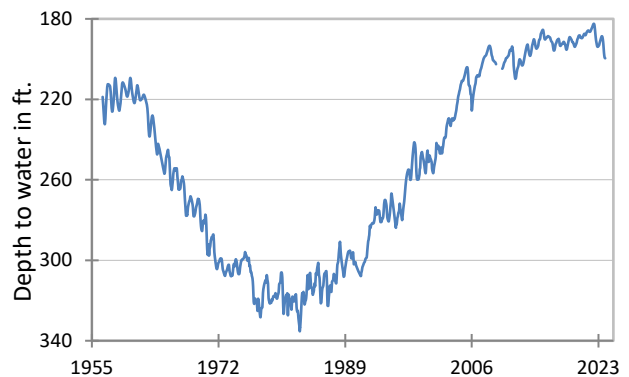
**\*(9) State Well #34-30-907**  
**Red Springs, Smith County**  
**Carrizo-Wilcox Aquifer**



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

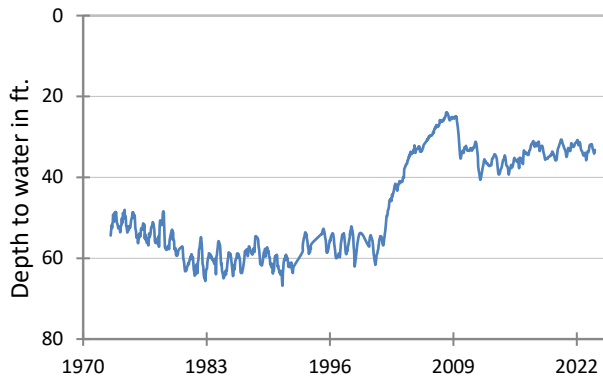


**(11) State Well #65-14-409**  
**North Houston, Harris County**  
**Evangeline Formation-Gulf Coast Aquifer**

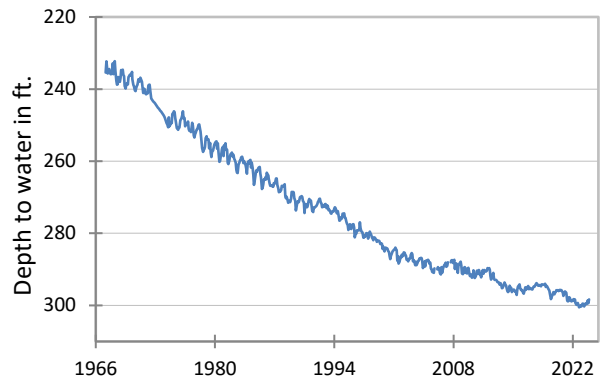


\* Recorder well #9 has been offline or the well has experienced issues since May 2023.

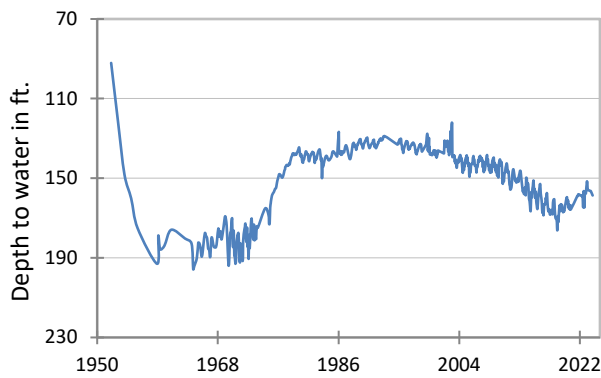
**(12) State Well #80-17-502**  
**Near Bloomington, Victoria County**  
**Lissie Formation-Gulf Coast Aquifer**



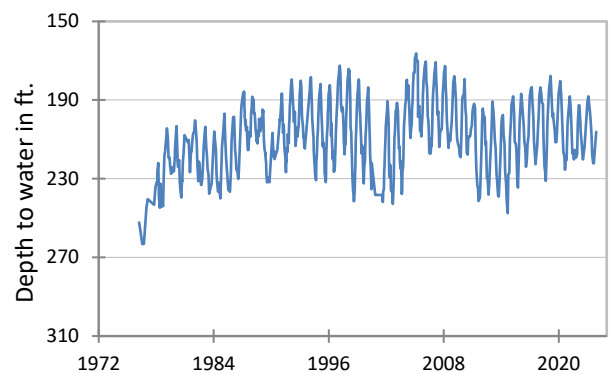
**(13) State Well #49-13-301**  
**El Paso, El Paso County**  
**Hueco-Mesilla Bolsons Aquifer**



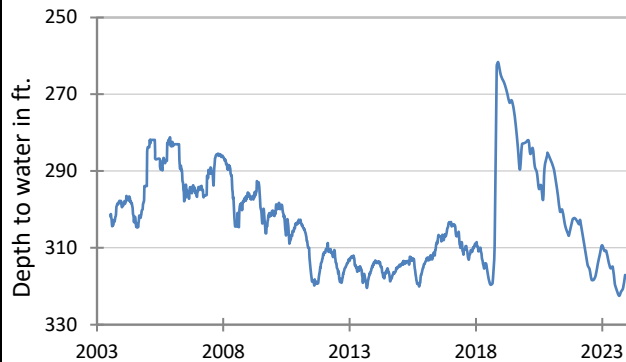
**(14) State Well #46-44-501**  
**Near Pecos, Reeves County**  
**Pecos Valley Aquifer**



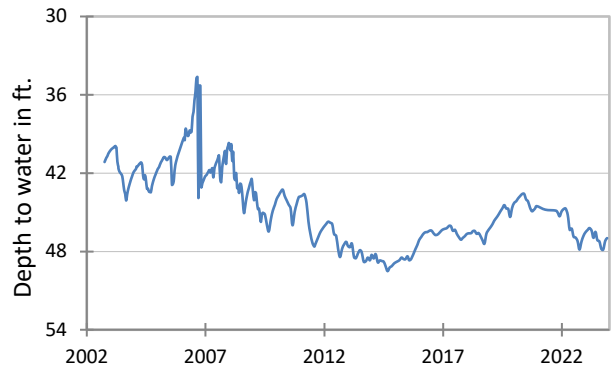
**(15) State Well #52-16-802**  
**Fort Stockton, Pecos County**  
**Edwards-Trinity (Plateau) Aquifer**



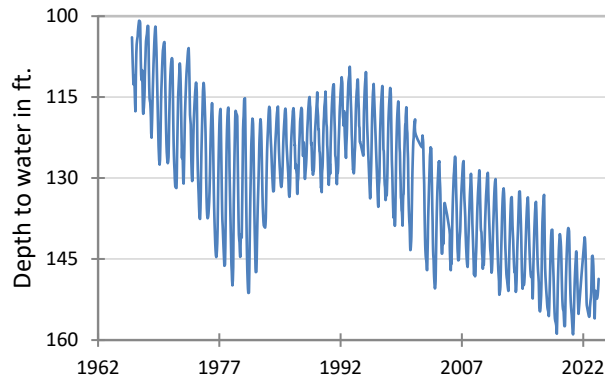
**(16) State Well #55-12-134**  
**Eldorado, Schleicher County**  
**Edwards-Trinity (Plateau) Aquifer**



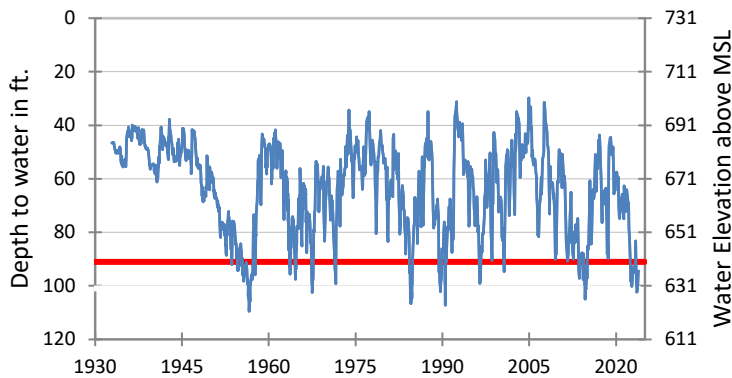
**(17) State Well #21-35-748**  
**Near O'Brien, Haskell County**  
**Seymour Aquifer**



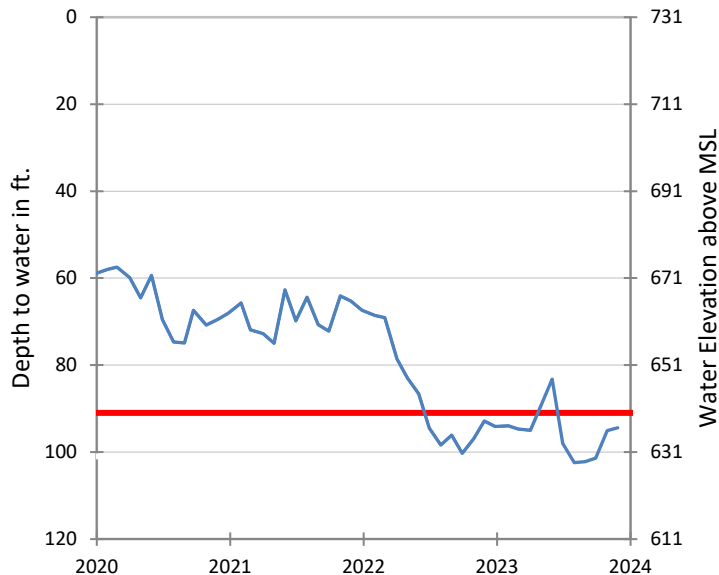
**(18) State Well #48-07-516  
Dell City, Hudspeth County  
Bone Spring-Victorio Peak Aquifer**



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



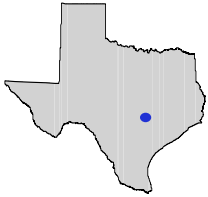
The late November water level measurement in this Edwards (Balcones Fault Zone) Aquifer well, located at an elevation of 731 feet above mean sea level, was 94.40 feet below land surface, or 636.60 feet above mean sea level. This was 0.70 feet above last month's measurement, 1.50 feet below last year's measurement, and 47.76 feet below the initial measurement recorded in 1932.



**Water levels below the red line indicate periods in which Edwards Aquifer Authority Stage 3 drought restrictions are in effect. The Edwards Aquifer Authority declared Stage 3 water restrictions effective November 1, 2023, as a result of well J-17 water levels and area spring flow levels.**



## HYDROGRAPH OF THE MONTH

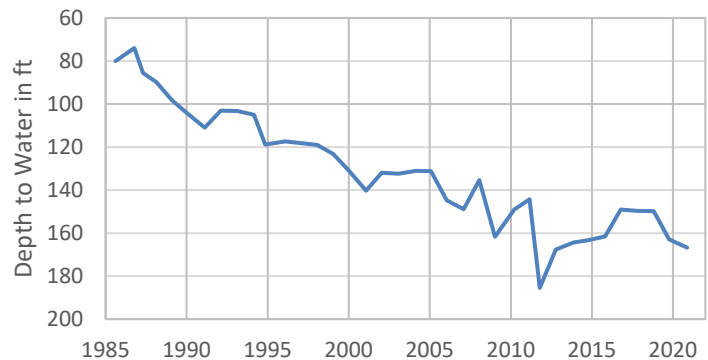


Each month this space features a new hydrograph (marked with the • symbol on the map) depicting different aquifers and their conditions in Texas.

The Edwards (Balcones Fault Zone) Aquifer is a major aquifer in the south-central part of Texas. It consists primarily of partially dissolved limestone that creates a highly permeable aquifer. Aquifer thickness ranges from 200 to 600 feet, and freshwater saturated thickness averages 560 feet in the southern part of the aquifer. The groundwater, although hard, is generally fresh and contains less than 500 milligrams per liter of total dissolved solids. Water from the aquifer is primarily used for municipal, irrigation, and recreational purposes. The majority of San Antonio's water supply comes from the Edwards (Balcones Fault Zone) Aquifer. Several well-known springs are fed from the aquifer including Comal Springs in Comal County, which is the largest spring in the state, and San Marcos Springs in Hays County, which is the second largest. Because of the aquifer's highly permeable nature, water levels and spring flows respond quickly to rainfall, drought, and pumping.<sup>1</sup>

### Edwards (Balcones Fault Zone) Aquifer

Well # 58-12-603, 720 feet deep  
Domestic, Williamson County



The initial water level measurement of 80.00 feet below land surface was recorded by TWDB in 1985. Since then, TWDB staff have returned almost every year to collect water level measurements. Over the period of record, the hydrograph shows a relatively consistent rate of water level decline at approximately -2.40 feet per year on average. The greatest observed decline was over 41 feet in 2011, which corresponds to the historic drought Texas experienced at the time.



Photos of well #58-12-603 well house (left) and measuring point (right)

1. Peter G. George, Ph.D., P.G., Robert E. Mace, Ph.D., P.G., Rima Petrossian, P.G. *Aquifers of Texas: Report 380.*; 2011.  
<https://www.twdb.texas.gov/groundwater/aquifer/majors/Edwards-bfz.asp>