Texas Water Conditions Report

February 2024

Water News:

The Texas Water Development Board, Water Science and Conservation Office is hiring! View and apply for current opportunities https://www.twdb.texas.gov/jobs/index.asp.

TWDB - 24-50 - Hydrometeorology Data Scientist

TWDB - 24-38 - Recorder Program Specialist

TWDB - 24-66 - WSC Office Coordinator (Executive Assistant I)

RAINFALL

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

Compared to historical data from 1991–2020, northeastern and southern High Plains, northern and southern Low Rolling Plains, southern Low Rolling Plains, much of the Edwards Plateau, northern and central Southern, northern and southern South Central, much of North Central, much of East Texas, and eastern Upper Coast climate divisions 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 northern and central High Plains, northern Low Rolling Plains, northwestern and central Trans Pecos, northern Edwards Plateau, northern and southern Southern, eastern Lower Valley, central South Central, northwestern Upper Coast, and central East Texas climate divisions. 200–400 percent of normal rainfall [light to dark blue shading, Figure 1(b)] was received in northern High Plains, northern and southern Southern, central South Central, and western Lower Valley climate divisions.

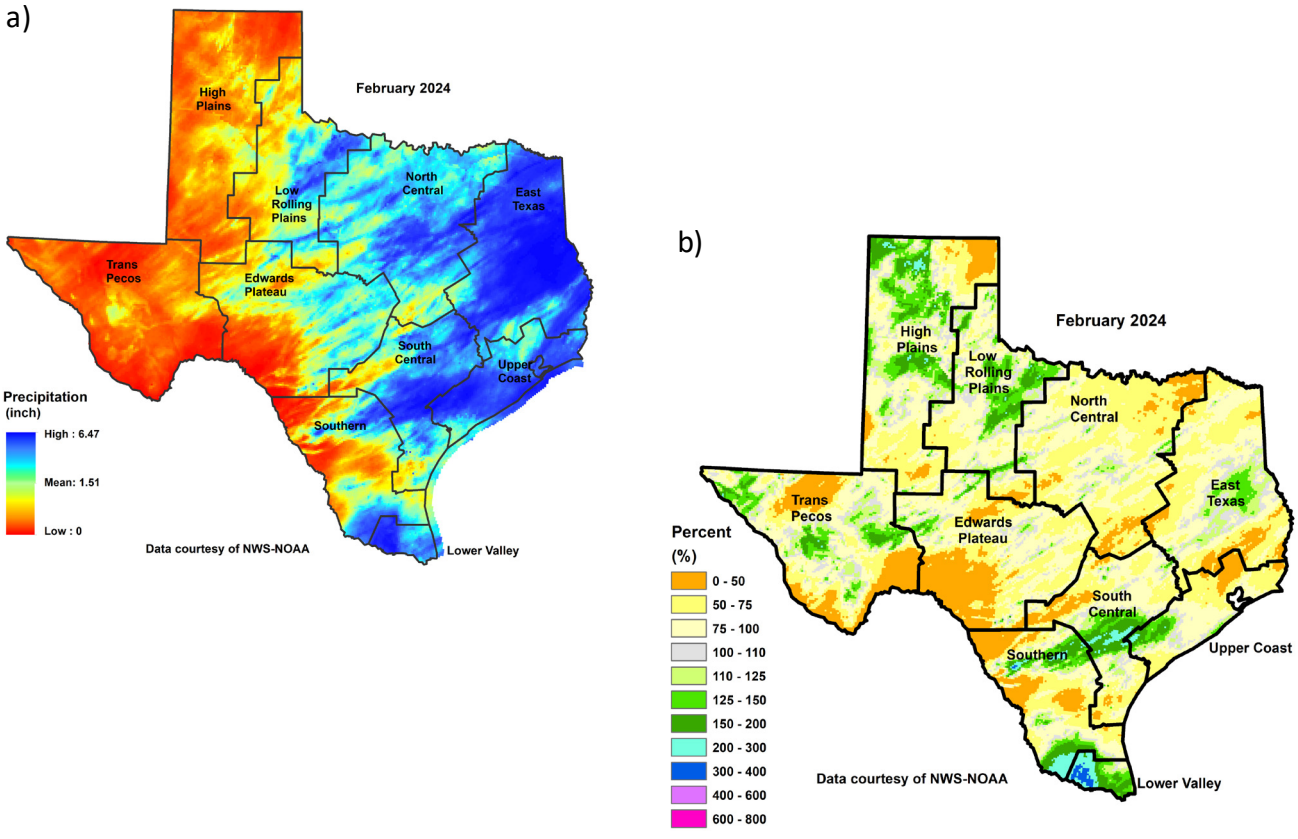


Figure 1: (a) Monthly accumulated rainfall, and (b) Percent of normal rainfall

DROUGHT

By the end of February drought conditions in portions of western Texas worsened compared to drought conditions at the end of January, while portions of northern, central, and eastern regions of Texas showed improvements in drought conditions (**Figure 2).**

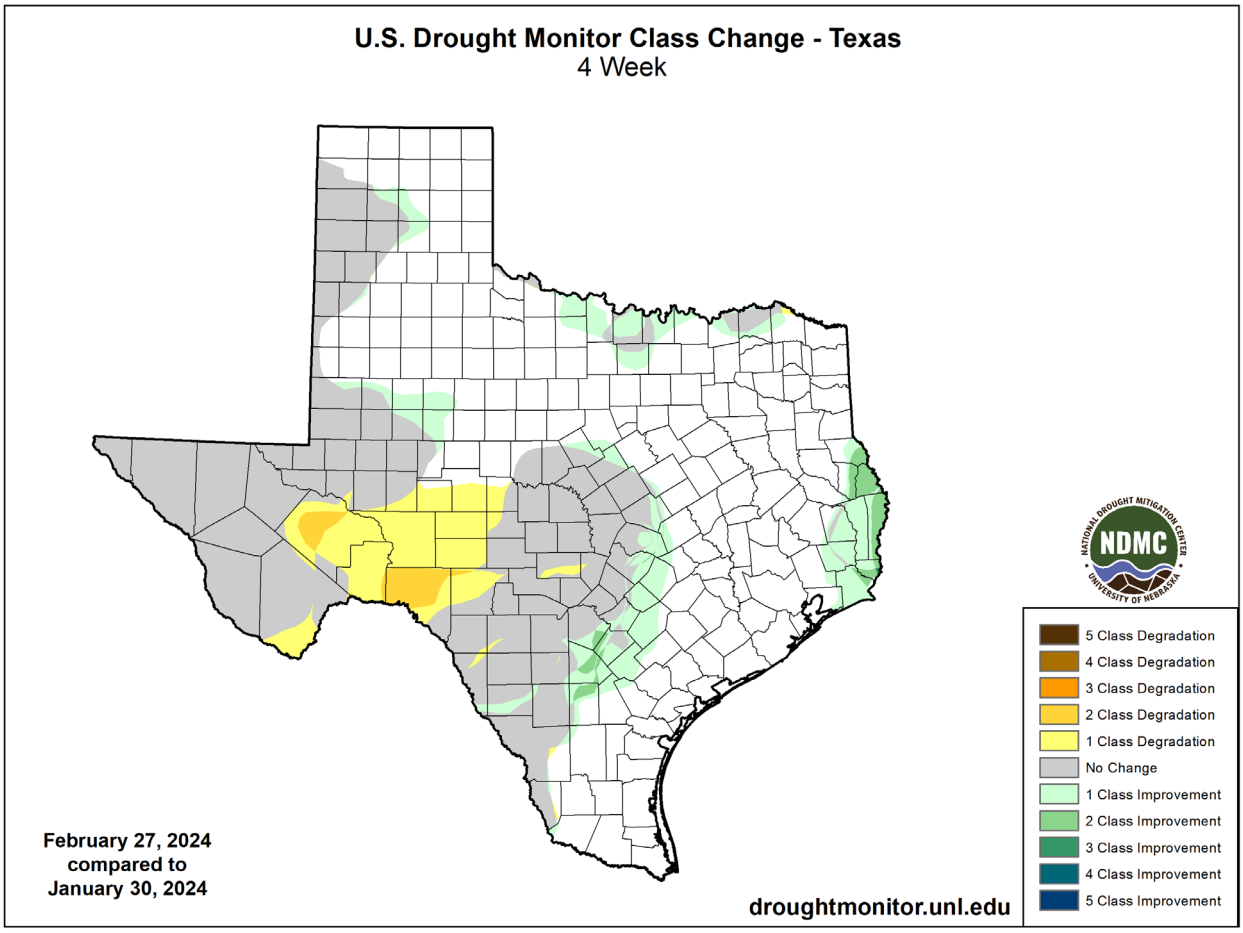


Figure 2. Comparison of drought conditions between February 27, and January 30, 2023. Areas of drought improvement shown in shades of green. Areas of drought degradation shown in shades of yellow. Gray shading reflects areas of no change in drought conditions.

RESERVOIR STORAGE

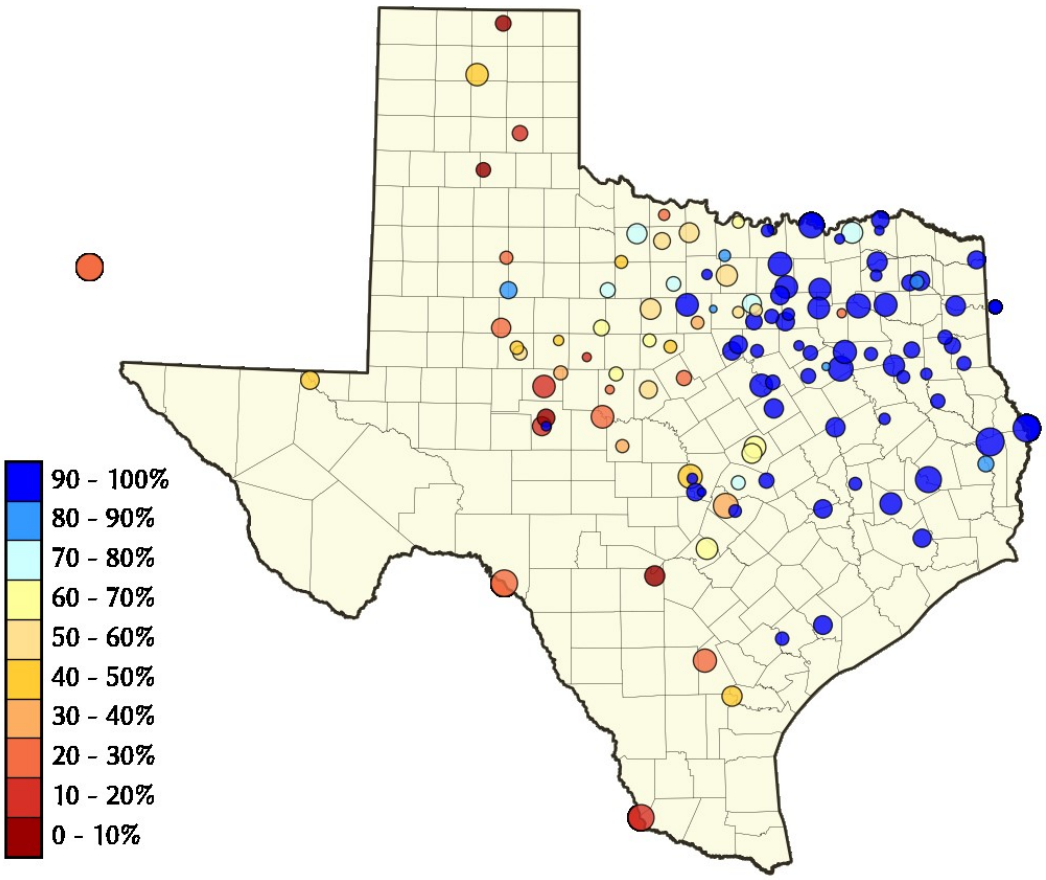


Figure 3. Reservoir conservation storage at end-February expressed as percent full (%)

Out of 119 reservoirs in the state, 35 reservoirs held 100 percent conservation storage capacity, and thirty reservoirs were at or above 90 percent full in February. Eighteen reservoirs remained below 30 percent full: Abilene (13.9 percent full), Amistad (26.7 percent full), Choke Canyon (24.1 percent full), E.V. Spence (15.8 percent full), Falcon (16.4 percent full), Greenbelt (11.2 percent full), Hords Creek (22.1 percent full), J.B. Thomas (21.1 percent full), Mackenzie (9.3 percent full), Medina Lake (3.1 percent full), New Terrell City Lake (28.5 percent full), North Fork Buffalo Creek Reservoir (29.0 percent full), O.C. Fisher (1.9 percent full), O.H. Ivie (27.3 percent full), Palo Duro Reservoir (4.0 percent full), Proctor (27.4 percent full), Twin Buttes (15.0 percent full), and the White River Lake (25.5 percent full). Elephant Butte Reservoir (New Mexico) was 25.3 percent full (Figure 3).

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS							
Name of lake or reservoir	Storage capacity	Storage at end-February 2024		Storage change from end-Jan 2024		Storage change from end-Feb 2023	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
Continued							
Granger Lake	51,822	51,822	100.0	0	0.0	0	0.0
Grapevine Lake	163,064	163,064	100.0	0	0.0	0	0.0
Greenbelt Lake	59,968	6,733	11.2	46	0.1	-256	0.0
*Halbert, Lake	6,033	5,323	88.2	463	7.7	16	0.3
Hords Creek Lake	8,109	1,790	22.1	-18	0.0	-671	-8.3
Houston County Lake	17,113	17,113	100.0	0	0.0	0	0.0
Houston, Lake	132,318	131,861	99.7	-457	0.0	-457	0.0
Hubbard Creek Reservoir	313,298	160,129	51.1	-811	0.0	-46,840	-15.0
Hubert H Moss Lake	24,058	23,831	99.1	332	1.4	1,987	8.3
Inks, Lake	13,729	13,060	95.1	101	0.7	-40	0.0
J. B. Thomas, Lake	199,931	42,442	21.2	-956	0.0	-3,217	-1.6
Jacksonville, Lake	25,670	25,670	100.0	0	0.0	0	0.0
Jim Chapman Lake (Cooper)	258,723	258,723	100.0	0	0.0	0	0.0
Joe Pool Lake	149,629	149,629	100.0	0	0.0	0	0.0
Kemp, Lake	245,307	174,862	71.3	9,720	4.0	37,504	15.3
Kickapoo, Lake	86,345	47,848	55.4	776	0.9	-2,762	-3.2
Lavon Lake	409,757	409,757	100.0	10,865	2.7	0	0.0
Leon, Lake	27,762	13,265	47.8	-174	0.0	-3,397	-12.2
Lewisville Lake	563,228	561,338	99.7	21,876	3.9	-1,890	0.0
Limestone, Lake	203,780	203,780	100.0	5,548	2.7	35,171	17.3
*Livingston, Lake	1,603,504	1,603,504	100.0	0	0.0	0	0.0
*Lost Creek Reservoir	11,950	10,832	90.6	355	3.0	-138	-1.2
Lyndon B Johnson, Lake	112,778	110,853	98.3	-64	0.0	0	0.0
Mackenzie Reservoir	46,450	4,339	9.3	-19	0.0	1,516	3.3
Marble Falls, Lake	7,597	7,191	94.7	-72	0.0	-18	0.0
Martin, Lake	75,726	75,726	100.0	2,113	2.8	0	0.0
Medina Lake	254,823	7,931	3.1	-423	0.0	-6,613	-2.6
Meredith, Lake	500,000	222,086	44.4	260	0.1	70,050	14.0
Millers Creek Reservoir	26,768	13,024	48.7	1,010	3.8	-3,035	-11.3
*Mineral Wells, Lake	5,273	4,690	88.9	179	3.4	526	10.0
Monticello, Lake	34,740	30,082	86.6	-440	-1.3	73	0.2
Mountain Creek, Lake	22,850	22,850	100.0	0	0.0	0	0.0
Murvaul, Lake	38,285	38,285	100.0	0	0.0	0	0.0
Nacogdoches, Lake	39,522	39,108	99.0	-414	-1.0	260	0.7
Nasworthy	9,615	8,935	92.9	-77	0.0	678	7.1
Navarro Mills Lake	49,827	49,827	100.0	0	0.0	1,403	2.8
New Terrell City Lake	8,583	2,450	28.5	-742	-8.6	-6,116	-71.3
Nocona, Lake (Farmers Crk)	21,444	14,292	66.6	-155	0.0	-1,706	-8.0
North Fork Buffalo Creek Reservoir	15,400	4,466	29.0	84	0.5	-2,308	-15.0
O' the Pines, Lake	241,363	241,363	100.0	0	0.0	0	0.0
O. C. Fisher Lake	115,742	2,220	1.9	-94	0.0	-1,268	-1.1
*O. H. Ivie Reservoir	554,340	151,344	27.3	-2,422	0.0	-63,370	-11.4
Oak Creek Reservoir	39,210	13,032	33.2	-115	0.0	-5,568	-14.2

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS							
Name of lake or reservoir	Storage capacity	Storage at end-February 2024		Storage change from end-Jan 2024		Storage change from end-Feb 2023	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
Continued							
Palestine, Lake	367,303	367,303	100.0	7,805	2.1	0	0.0
Palo Duro Reservoir	61,066	2,460	4.0	-259	0.0	2,250	3.7
Palo Pinto, Lake	26,766	9,463	35.4	-189	0.0	-5,501	-20.6
Pat Cleburne, Lake	26,008	26,008	100.0	0	0.0	6,601	25.4
*Pat Mayse Lake	113,683	110,042	96.8	2,826	2.5	-3,641	-3.2
Possum Kingdom Lake	538,139	531,898	98.8	8,643	1.6	90,901	16.9
Proctor Lake	54,762	14,982	27.4	-189	0.0	-7,933	-14.5
Ray Hubbard, Lake	439,559	439,559	100.0	1,044	0.2	0	0.0
Ray Roberts, Lake	788,167	775,750	98.4	11,178	1.4	5,322	0.7
Red Bluff Reservoir	151,110	62,851	41.6	0	0.0	-34,682	-23.0
Richland-Chambers Reservoir	1,099,417	1,099,417	100.0	0	0.0	113,460	10.3
Sam Rayburn Reservoir	2,857,077	2,627,417	92.0	185,732	6.5	-229,660	-8.0
Somerville Lake	150,293	150,293	100.0	7,871	5.2	25,973	17.3
Squaw Creek, Lake	151,250	150,649	99.6	-601	0.0	-601	0.0
Stamford, Lake	51,570	36,680	71.1	-1186	-2.3	5,085	9.9
Stillhouse Hollow Lake	229,796	140,365	61.1	1,882	0.8	-21,485	-9.3
Striker, Lake	16,878	16,878	100.0	1	0.0	0	0.0
Sweetwater, Lake	12,267	5,715	46.6	-56	0.0	-1,535	-12.5
*Sulphur Springs, Lake	17,747	17,747	100.0	1,765	9.9	1,781	10.0
Tawakoni, Lake	871,685	871,685	100.0	0	0.0	0	0.0
Texana, Lake	158,975	157,642	99.2	-818	0.0	611	0.4
Texoma, Lake (Texas & Oklahoma)	2,487,601	2,398,074	96.4	-56,015	-2.3	-27,715	-1.1
Texoma, Lake (Texas)	1,243,801	1,199,036	96.4	-28,008	-2.3	-13,858	-1.1
Toledo Bend Reservoir (Texas & Louisiana)	4,472,900	4,293,584	96.0	-21,014	0.0	34,994	0.8
Toledo Bend Reservoir (Texas)	2,236,450	2,144,742	95.9	-10,507	0.0	17,497	0.8
Travis, Lake	1,098,044	421,023	38.3	3,103	0.3	-77,790	-7.1
Twin Buttes Reservoir	182,454	27,411	15.0	-479	0.0	-25,019	-13.7
Tyler, Lake	72,073	72,073	100.0	1,358	1.9	0	0.0
Waco, Lake	189,418	189,094	99.8	-324	0.0	78,750	41.6
Waxahachie, Lake	11,060	11,060	100.0	1,123	10.2	0	0.0
Weatherford, Lake	17,812	10,601	59.5	-27	0.0	245	1.4
White River Lake	29,880	7,619	25.5	-193	0.0	3,680	12.3
Whitney, Lake	564,808	564,808	100.0	0	0.0	126,118	22.3
Worth, Lake	24,419	14,494	59.4	148	0.6	-964	-3.9
Wright Patman Lake	122,593	122,593	100.0	0	0.0	0	0.0
STATEWIDE TOTAL							
STATEWIDE TOTAL	**32,387,302**	**23,404,644**	**72.3**	**262,132**	**0.8**	**-403,692**	**-1.2**

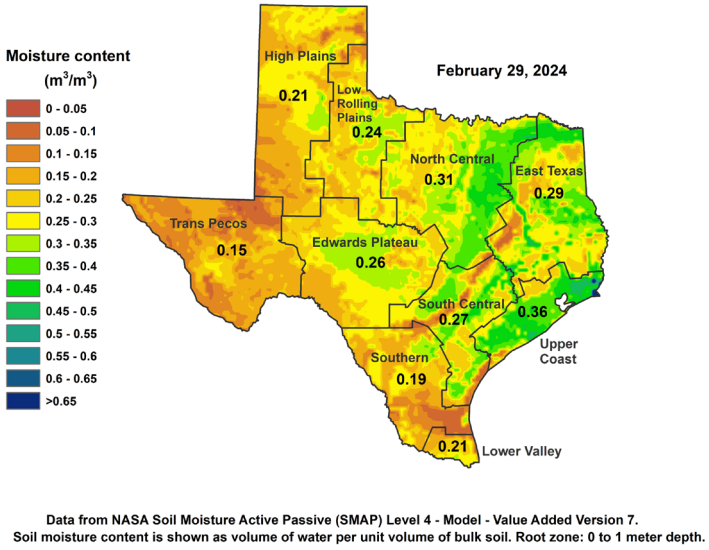
*Total volume below elevation of conservation pool top is used as the conservation storage capacity, because the dead pool storage is unknown.
**Monthly and yearly changes do not include reservoirs that did not have data in the last month or last year, respectively.

SOIL MOISTURE

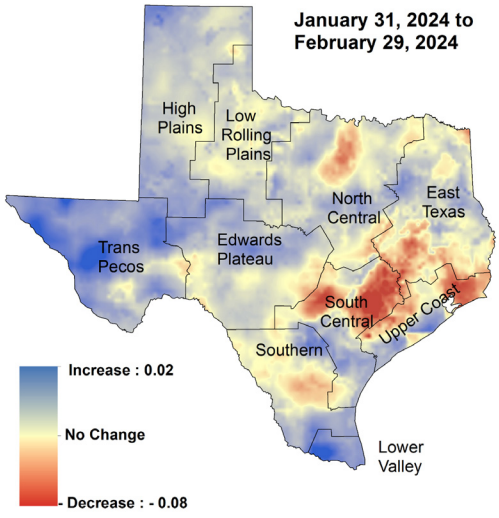
At the end of February 2024, root zone soil moisture was low [yellow, orange, Figure 5(a)] in areas of the High Plains, Trans Pecos, Low Rolling Plains, Edwards Plateau, Southern, South Central, Lower Valley, North Central, South Central, and East Texas. Areas of more severe dryness [brown shading, Figure 5(a)] were seen in northeastern Trans Pecos, northeastern High Plains, northern Low Rolling Plains, southern and northeastern Southern, portions of northern and southern South Central, and southwestern East Texas climate divisions. Average soil moisture [green shading, Figure 5(a)] was seen in the eastern High Plains, central Low Rolling Plains, central Edwards Plateau, northeastern Southern, central and eastern North Central, portions of northern and southern South Central, portions of East Texas, and the Upper Coast climate divisions.

Compared to conditions at the end of January 2024, soil moisture increased [blue shading in Figure 5(b)] in the High Plains, Low Rolling Plains, Trans Pecos, Edwards Plateau, Lower Valley, portions of Southern, North Central, East Texas, the Upper Coast, and southern South Central climate divisions. Soil moisture decreased [red shading in Figure 5(b)] in central Southern, northern South Central, northern North Central, southern East Texas, and portions of the Upper Coast climate divisions.

a)



b)



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 February2024 and (b) the difference in root zone soil moisture between end-January 2024 and end-February 2024.

STREAMFLOW CONDITIONS

Normal streamflow (25–75th percentile, green shading, Figure 6) was recorded in parts of the Panhandle, Northern, Eastern, Central, and Western regions of Texas this month. Above normal streamflow (76–90th percentile, light blue shading, Figure 6) was seen in the Canadian (Lower Beaver and Middle Canadian Spring watersheds), Upper Red (Southern Beaver watershed), Brazos (Running Water Draw, Middle Brazos-Millers, Paint, Bosque, North Bosque, and Middle Brazos-Lake Whitney watersheds), Trinity (Cedar, Chambers and Lower Trinity watersheds), Cypress (Lake O' the Pines watershed), Neches (Upper and Lower Angelina watersheds), San Jacinto (West Fork San Jacinto watershed), Lavaca, Colorado-Lavaca (East Matagorda Bay watershed), San Antonio-Nueces, Lavaca-Guadalupe (West Matagorda Bay watershed) river basins. Much above normal streamflow (>90th percentile, dark blue shading, Figure 6) was seen in the Upper Red (South Wichita watershed), Middle and Lower Neches, and Lower Guadalupe river basins.

Below normal streamflow (10–24th percentile, orange shading, Figure 6) was recorded in the Upper Red (Upper North Fork Red, Elm Fork Red, and Blue China watersheds), Upper Brazos (Double Mountain Fork Brazos watershed), Colorado (Upper Colorado, Pecan Bayou, Llano, North Llano, San Saba, and Buchanan-Lyndon B. watersheds), San Antonio (Medina watershed), Nueces, and Nueces-Rio Grande river basins. Much below normal stream flow (< 10th percentile, dark red shading, Figure 6) was seen in Colorado (Middle Colorado Elm and Pedernales watersheds), Upper and Middle Guadalupe, and Middle Nueces river basins.

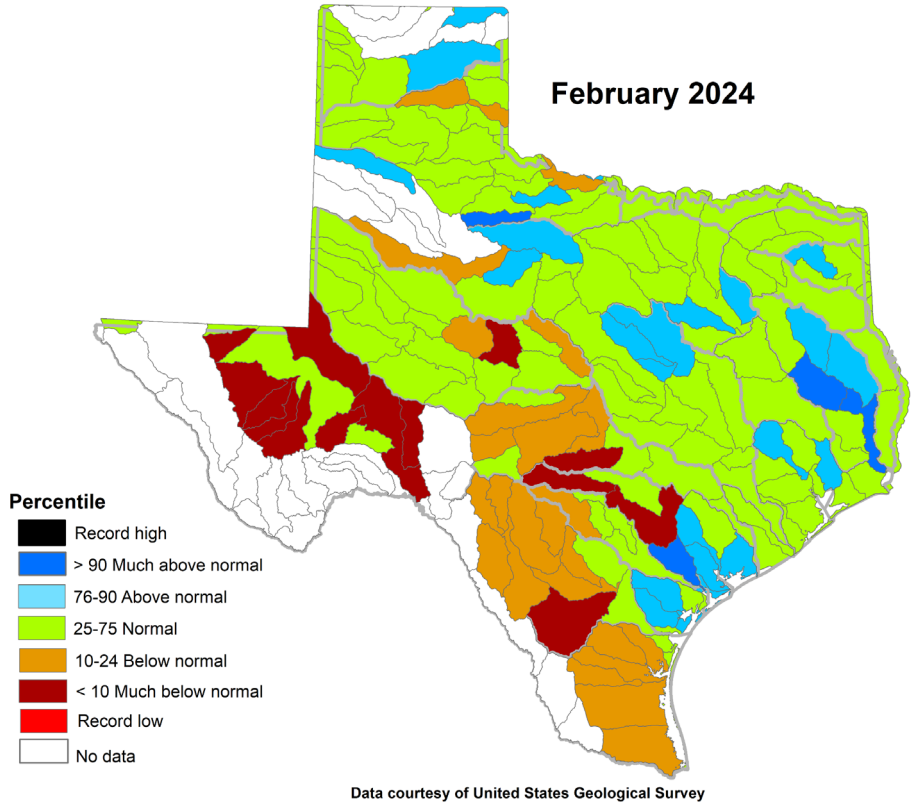
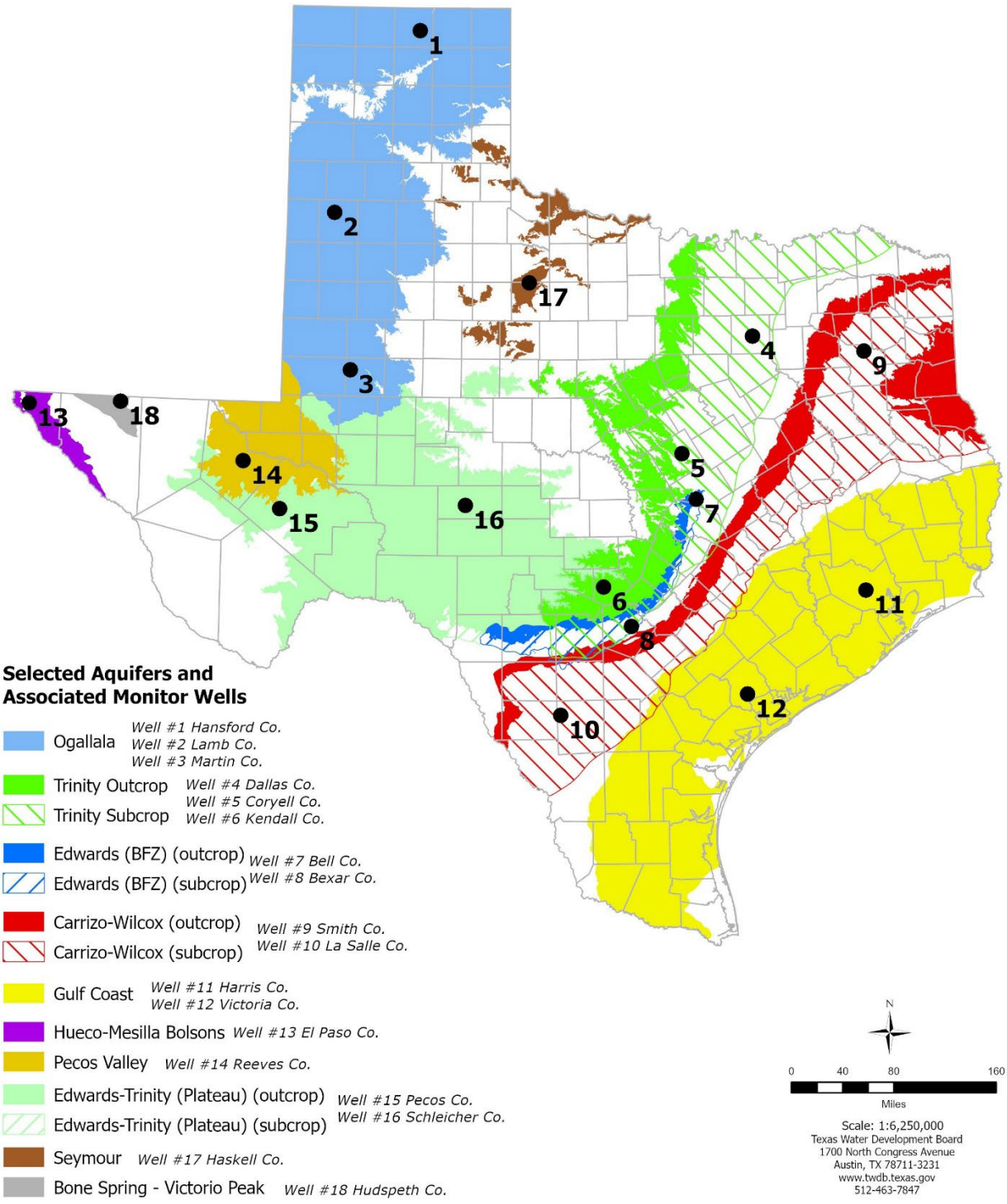


Figure 6: Runoff percentiles by the U.S. Geological Survey's Hydrologic Unit Code



FEBRUARY 2024 GROUNDWATER LEVELS IN MONITORING WELLS

Water level measurements were available for 16 key monitoring wells in the state. The recorders in two wells (#3 and #9 on map) were offline or the well experienced issues during the reporting period. Water levels rose in eleven monitoring wells since the beginning of February, with an increase of 0.03 feet in the Schleicher County Edwards-Trinity (Plateau) Aquifer well (#16 on map) to 7.10 feet in the Reeves County Pecos Valley Aquifer well (#14 on map). Water levels declined in five monitoring wells, ranging from a decline of -0.06 feet in the Lamb County Ogallala Aquifer well (#2 on map) to -2.70 feet in the Bexar County Edwards (BFZ) Aquifer well (#8 on map). The J-17 well (#8 on map) in San Antonio recorded a water level of 86.90 feet below land surface or 644.10 feet above mean sea level. Water levels are 5.90 feet below the Stage 2 critical management levels for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer. The Edwards Aquifer Authority declared Stage 2 water restrictions effective January 25, 2024, 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	February (depth to water, feet)	January (depth to water, feet)	Month Change	Year Change	Historical Change*	First Measured (year)
(1) Hansford 0354301	165.17	165.01	-0.16	-1.25	-95.05	1951
(2) Lamb 1053602	154.76	154.70	-0.06	-1.09	-126.59	1951
(3) Martin 2739903	NA	NA	NA	NA	-41.32	1964
(4) Dallas 3319101	503.37	503.71	0.34	-6.23	-281.37	1954
(5) Coryell 4035404	546.06	546.80	0.74	-3.26	-254.06	1955**
(6) Kendall 6802609	153.49	158.66	5.17	0.20	-93.49	1975
(7) Bell 5804816	124.57	124.17	-0.40	0.42	-1.06	2008
(8) Bexar 6837203	86.90	84.20	-2.70	7.80	-40.26	1932
(9) Smith 3430907	NA	NA	NA	NA	-140.39	1977**
(10) La Salle 7738103	523.87	527.16	3.29	14.23	-270.80	2003
(11) Harris 6514409	197.74	198.54	0.80	-5.87	-62.24*	1947**
(12) Victoria 8017502	33.13	33.35	0.22	0.38	0.87	1958**
(13) El Paso 4913301	298.80	298.84	0.04	0.68	-66.90	1964**
(14) Reeves 4644501	150.14	157.24	7.10	5.78	-58.05	1952
(15) Pecos 5216802	201.20	198.80	-2.40	-13.16	45.68	1976
(16) Schleicher 5512134	314.81	314.84	0.03	-4.45	-12.91	2003
(17) Haskell 2135748	46.73	46.79	0.06	-0.52	-3.73	2002
(18) Hudspeth 4807516	146.43	146.69	0.26	-3.01	-42.51	1966

**Change since the original measurement taken on the date indicated in the last column. The historical changes shown for recorder wells #3 and #9 are based off the most recent water level records from December 2023 and April 2023, respectively.

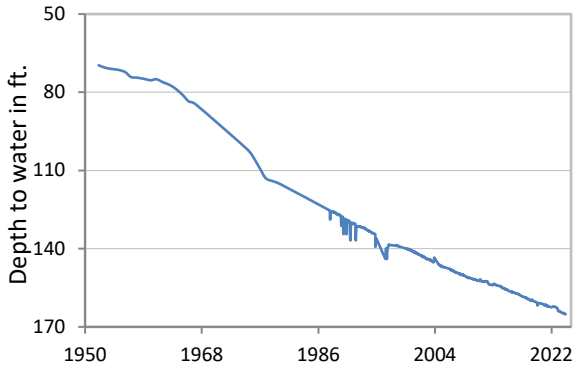
** Measurement not shown on the hydrograph.

NA (not available)

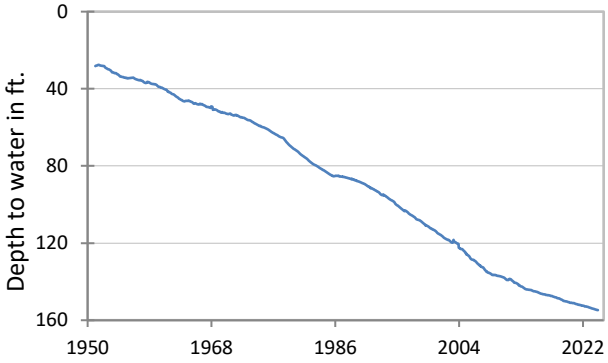
All data are provisional and subject to revision.

FEBRUARY 2024 MONITORING WELL HYDROGRAPHS

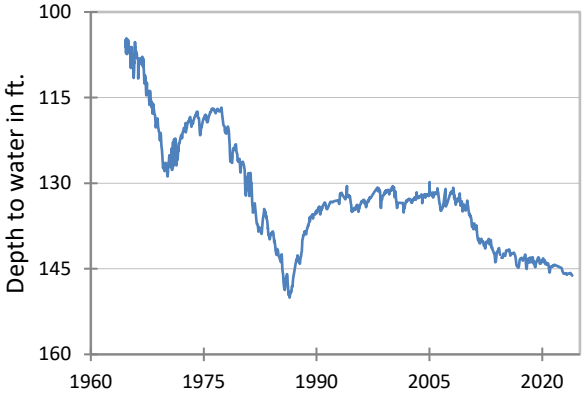
(1) State Well #03-54-301
Near Spearman, Hansford County
Ogallala Aquifer



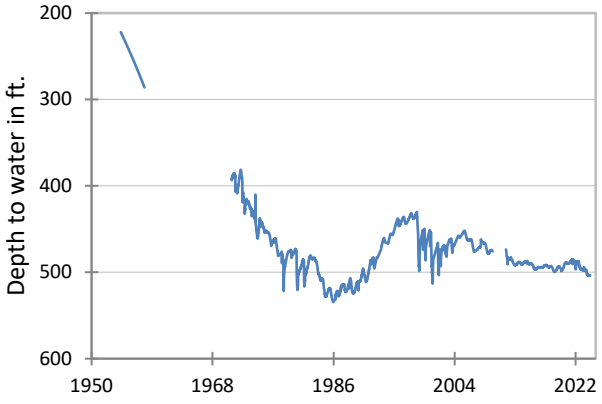
(2) State Well #10-53-602
Near Earth, Lamb County
Ogallala Aquifer



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

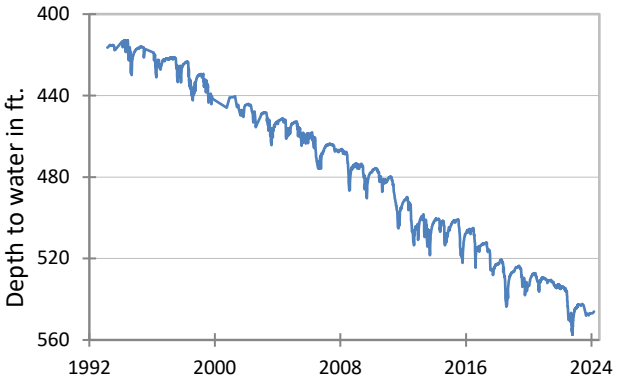


(4) State Well #33-19-101
Southeast Dallas, Dallas County
Twin Mountains Formation-Trinity Aquifer

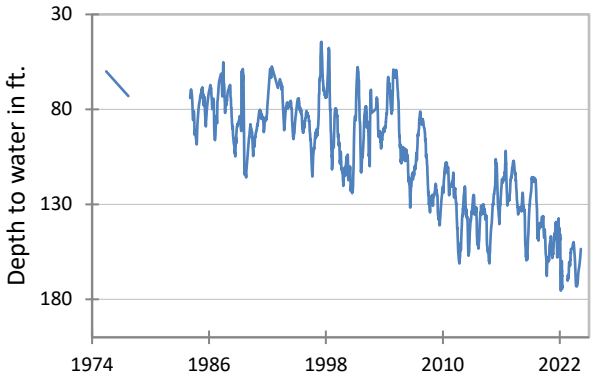


*** Recorder well #3 has been offline since December 2023 and did not record data.**

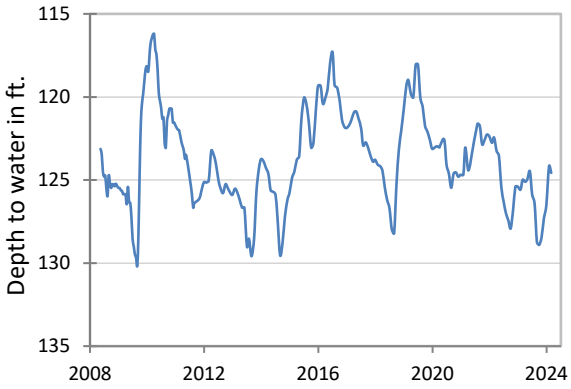
(5) State Well #40-35-404
Gatesville, Coryell County
Hosston Formation-Trinity Aquifer



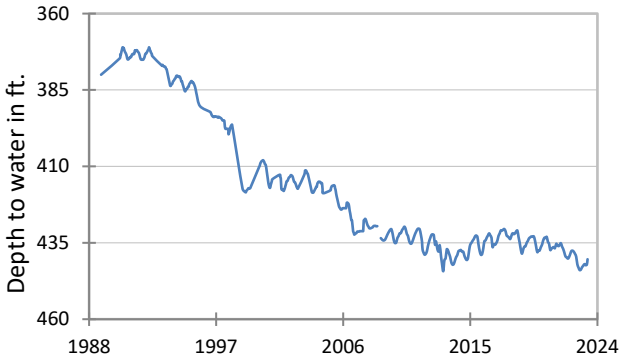
(6) State Well #68-02-609
Waring, Kendall County
Travis Peak Formation-Trinity Aquifer



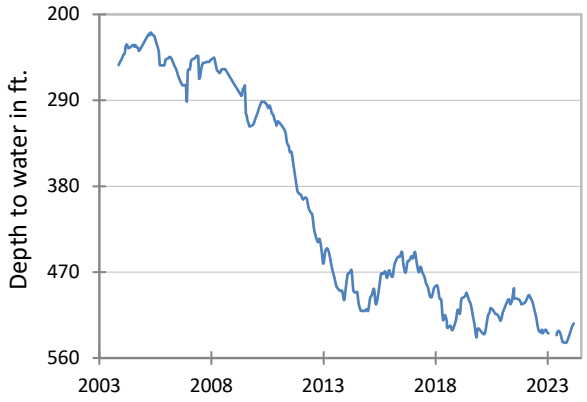
(7) State Well #58-04-816
Near Salado, Bell County
Edwards (Balcones Fault Zone) Aquifer



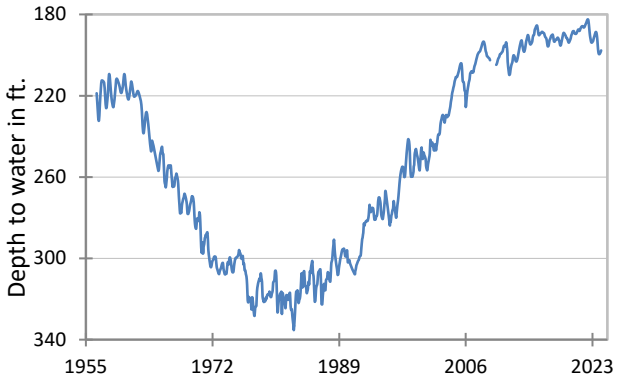
***(9) State Well #34-30-907**
Red Springs, Smith County
Carrizo-Wilcox Aquifer



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

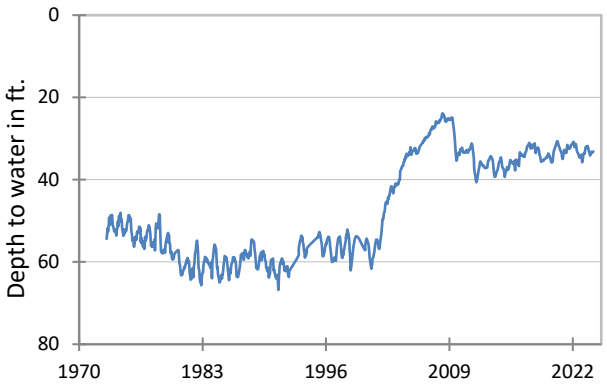


(11) State Well #65-14-409
North Houston, Harris County
Evangeline Formation-Gulf Coast Aquifer

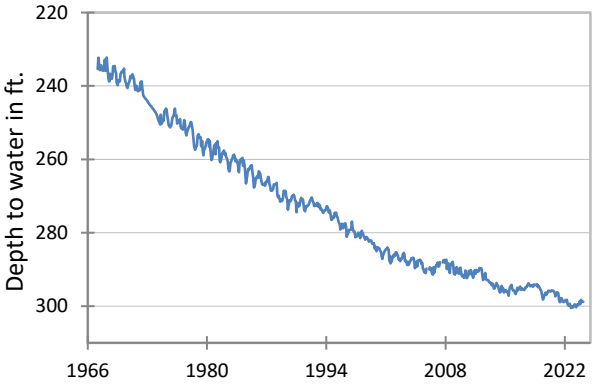


*** Recorder well #9 has been offline or the well has experienced issues since May 2023.**

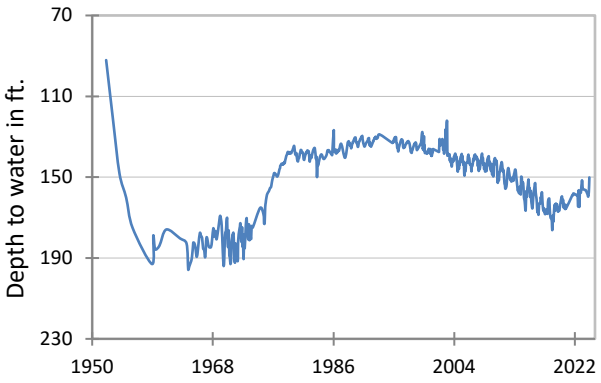
(12) State Well #80-17-502
Near Bloomington, Victoria County
Lissie Formation-Gulf Coast Aquifer



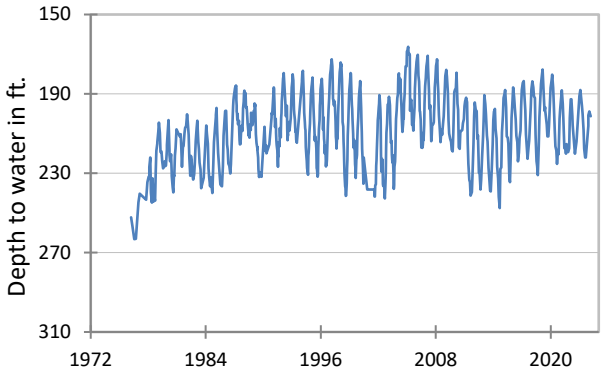
(13) State Well #49-13-301
El Paso, El Paso County
Hueco-Mesilla Bolsons Aquifer



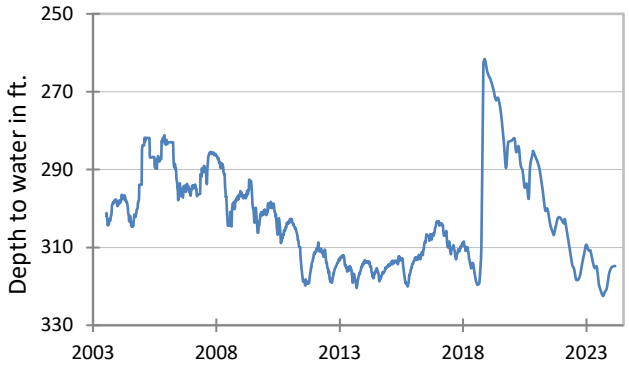
(14) State Well #46-44-501
Near Pecos, Reeves County
Pecos Valley Aquifer



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



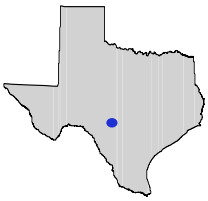
(16) State Well #55-12-134
Eldorado, Schleicher County
Edwards-Trinity (Plateau) Aquifer



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

***Recorder well #15 automated data reporting to TWDB resumed in February 2024. Manual measurements are reported for December 2023 and Janauary 2024.**

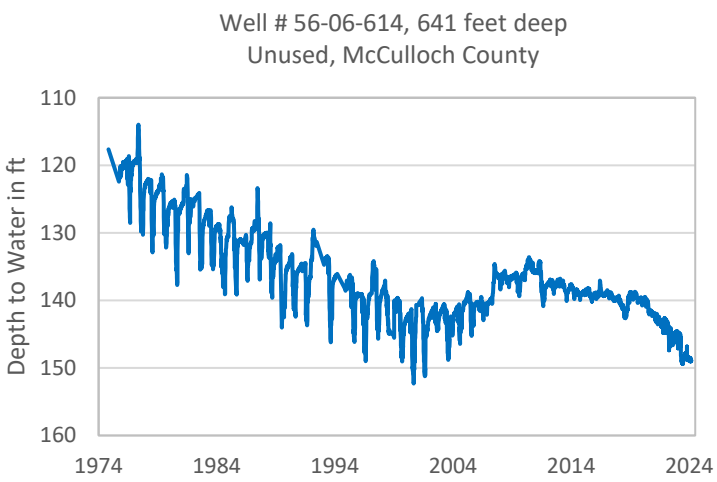
HYDROGRAPH OF THE MONTH



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

Hickory Aquifer

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



The initial measurement of 117.66 feet below land surface was recorded by the Texas Water Development Board (TWDB) in November of 1974. The next year, TWDB installed an automatic water-level recorder, which continues to collect hourly measurements (available online) and daily measurements (in the TWDB Groundwater Database). The period of record reveals seasonal fluctuations and a steady decline in water level until 2002. After that, seasonal fluctuations lessen as water levels increase, likely a result of decreased nearby pumping. Water levels begin to decline again in 2011 and 2021—corresponding to different periods of past and ongoing drought conditions in the area.

Photo of well #56-06-614 general setting and measuring point

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/minors/hickory.asp