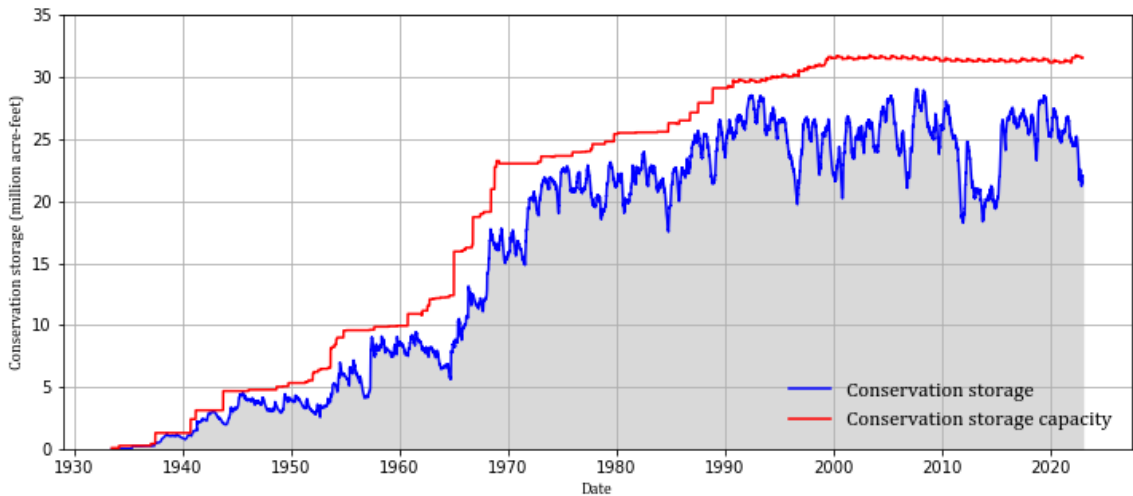


Texas Water Conditions Report

November 2022

Statewide monitored major water supply reservoir conservation storage



Water News:

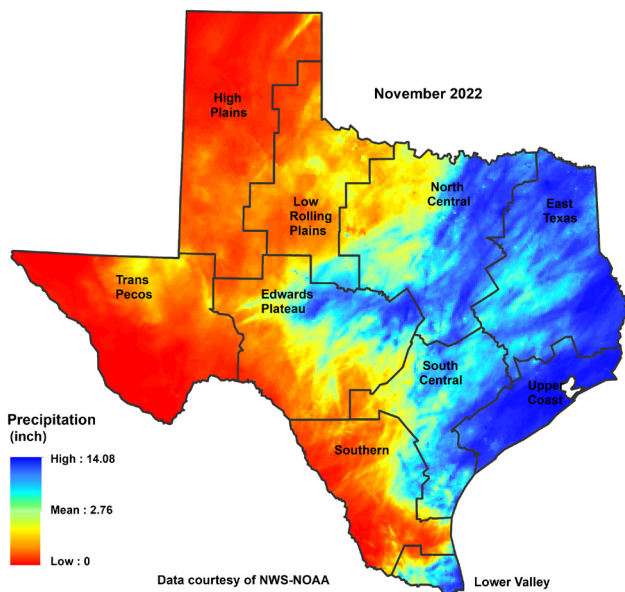
Statewide conservation storage of monitored water supply reservoirs increased from last month in 64 reservoirs (53.8 % of reservoirs), decreased in 9 reservoirs (7.6% of reservoirs), and remained the same in 45 reservoirs (37.8% of reservoirs). For daily updates on reservoir storage across the state visit, <https://waterdatafortexas.org/reservoirs/statewide>.

RAINFALL

Little to no rain [yellow, orange, and red shading, Figure 1(a)] fell in the High Plains, much of the Low Rolling Plains, Trans Pecos, southern and western Edwards Plateau, much of the Southern, northwestern and areas of southern South Central, northwestern Lower Valley, and northwestern North Central climate conditions. Some rainfall [light blue and dark blue shading, Figure 1(a)] was seen in northeastern Edwards Plateau, central and eastern North Central, much of South Central, Upper Coast, and East Texas, with accumulations reaching 14.08 inches.

Compared to historical data from 1991–2020, areas of the state that received below average rainfall [yellow and orange shading, Figure 1(b)] were the northern High Plains, northern Low Rolling Plains, western and southern Trans Pecos, portions of southern Edwards Plateau, northwestern North Central, portions of East Texas, and much of the Southern climate divisions. The southern High Plains, portions of the Low Rolling Plains, much of the North Central, northern and eastern East Texas, northern Trans Pecos, northern Edwards Plateau, much of the South Central and Upper Coast climate divisions received 125–200 percent of normal rainfall [light green, dark green shading, Figure 1(b)]. 200–300 percent of normal rainfall [light blue shading, Figure 1(b)] was seen in the northern Trans Pecos, northern Edwards Plateau, southern Low Rolling Plains, eastern North Central, small areas of northern and eastern East Texas, eastern Southern, southern South Central, the Lower Valley, and portions of the Upper Coast climate divisions. Northern Trans Pecos, northern Edwards Plateau, and the Lower Valley climate divisions received 300–600 percent of normal rainfall [(dark blue, and light pink shading, Figure 1 (b))].

a)



b)

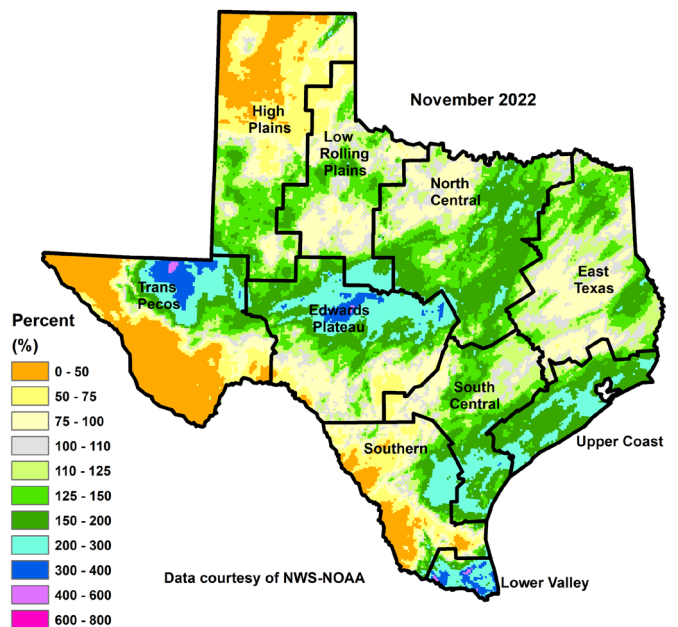


Figure 1: (a) Monthly accumulated rainfall, and (b) Percent of normal rainfall

DROUGHT

At the end of November, 74.14 % of the state was in the D0 (abnormally dry) through D4 (exceptional drought) categories (**Figure 2**). That is a decrease of 17.8% from the beginning of November.

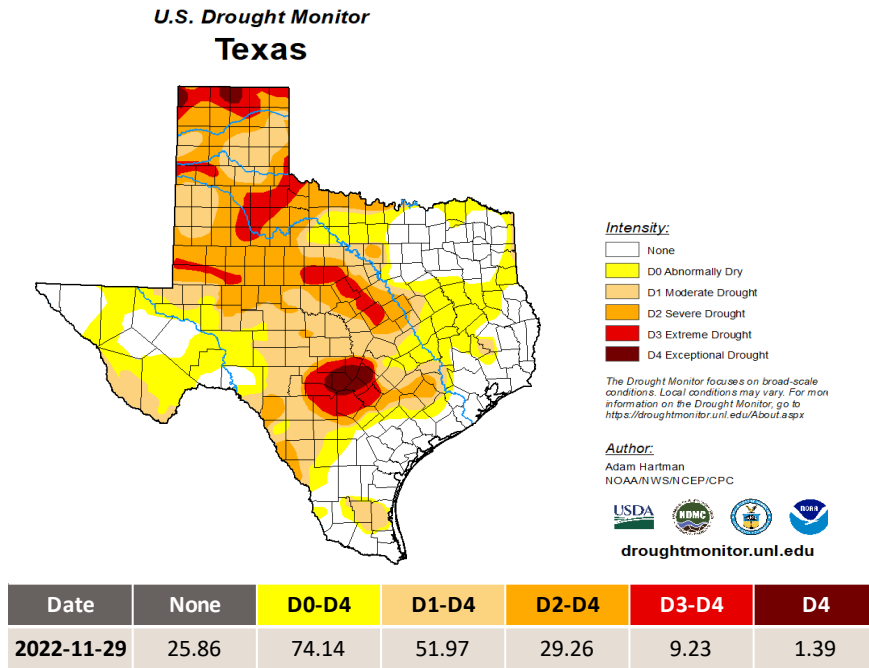


Figure 2. The percentage of drought in Texas according to the U.S. Drought Monitor map as of November 29, 2022.

RESERVOIR STORAGE

Out of 119 reservoirs in the state, 11 reservoirs held 100 percent conservation storage capacity (Figure 3). Additionally, 23 reservoirs were at or above 90 percent full. Ten reservoirs remained below 30 percent full: E.V. Spence (18.8 percent full), O. C. Fisher (3.2 percent full), J.B. Thomas (25.1 percent full), Falcon (14.1 percent full), Greenbelt (12.0 percent full), Mackenzie (6.3 percent full, Medina Lake (6.7 percent full), Palo Duro Reservoir (0.5 percent full), Twin Buttes (29.0 percent full), and the White River Lake (14.5 percent full). Elephant Butte Reservoir (New Mexico) was 9.0 percent full (Figure 3).

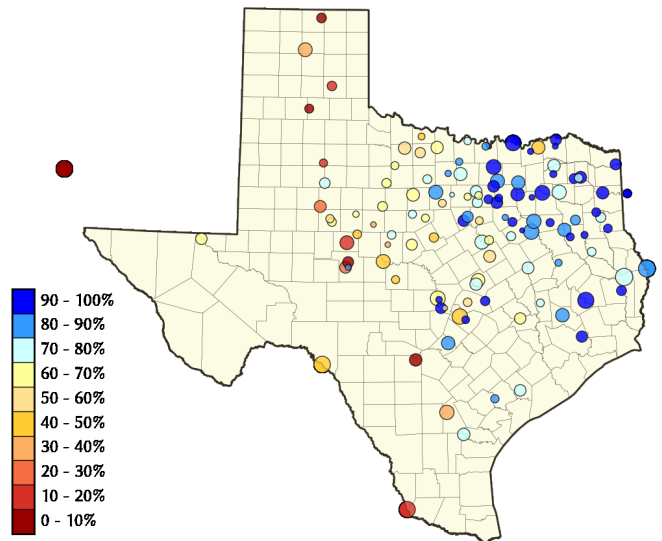


Figure 3. Reservoir conservation storage at end-November expressed as percent full (%)

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

| Name of lake or reservoir | Storage capacity | Storage at end-November 2022 | | Storage change from end-Oct 2022 | | Storage change from end-Nov 2021 | |
|--|------------------|------------------------------|-------|----------------------------------|------|----------------------------------|-------|
| | (acre-feet) | (acre-feet) | (%) | (acre-feet) | (%) | (acre-feet)** | (%) |
| Abilene, Lake | 7,900 | 2,882 | 36.5 | -133 | -1.7 | -3,377 | -42.7 |
| Alan Henry Reservoir | 96,207 | 72,054 | 74.9 | -950 | 0.0 | -15,837 | -16.5 |
| *Amistad Reservoir (Texas & Mexico) | 3,275,532 | 1,475,743 | 45.1 | 36,280 | 1.1 | 355,465 | 10.9 |
| *Amistad Reservoir (Texas) | 1,840,849 | 861,259 | 46.8 | 14,325 | 0.8 | -52,460 | -2.8 |
| Amon G Carter, Lake | 19,266 | 16,513 | 85.7 | -124 | 0.0 | -2,753 | -14.3 |
| Aquilla Lake | 43,243 | 28,416 | 65.7 | 725 | 1.7 | -11,889 | -27.5 |
| Arlington, Lake | 40,157 | 40,157 | 100.0 | 5,310 | 13.2 | 6,589 | 16.4 |
| Arrowhead, Lake | 230,359 | 155,247 | 67.4 | -1,851 | 0.0 | -46,729 | -20.3 |
| Athens, Lake | 29,503 | 27,636 | 93.7 | 856 | 2.9 | -1,867 | -6.3 |
| *Austin, Lake | 23,972 | 23,081 | 96.3 | 186 | 0.8 | 155 | 0.6 |
| B A Steinhagen Lake | 69,186 | 64,380 | 93.1 | 2,323 | 3.4 | -1,777 | -2.6 |
| Bardwell Lake | 43,856 | 41,647 | 95.0 | 5,412 | 12.3 | -870 | -2.0 |
| Belton Lake | 432,631 | 291,045 | 67.3 | 2,688 | 0.6 | -118,415 | -27.4 |
| Benbrook Lake | 85,648 | 64,594 | 75.4 | 4,895 | 5.7 | 916 | 1.1 |
| Bob Sandlin, Lake | 192,417 | 182,151 | 94.7 | 4,391 | 2.3 | 4,733 | 2.5 |
| Bois d'Arc Lake | 367,609 | 163,492 | 44.5 | 23,652 | 6.4 | no data | |
| Bonham, Lake | 11,027 | 11,027 | 100.0 | 1,200 | 10.9 | 2,525 | 22.9 |
| Brady Creek Reservoir | 28,808 | 13,073 | 45.4 | 603 | 2.1 | -3,725 | -12.9 |
| Bridgeport, Lake | 372,183 | 273,942 | 73.6 | -2,379 | 0.0 | -63,607 | -17.1 |
| *Brownwood, Lake | 130,868 | 81,906 | 62.6 | -51 | 0.0 | -41,220 | -31.5 |
| Buchanan, Lake | 866,694 | 522,644 | 60.3 | 4,392 | 0.5 | -239,435 | -27.6 |
| Caddo, Lake | 29,898 | 29,898 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| Canyon Lake | 378,781 | 306,533 | 80.9 | -5,750 | -1.5 | -72,001 | -19.0 |
| Cedar Creek Reservoir in Trinity | 644,686 | 545,467 | 84.6 | 46,346 | 7.2 | -51,073 | -7.9 |
| Champion Creek Reservoir | 41,580 | 25,168 | 60.5 | -272 | 0.0 | -4,243 | -10.2 |
| Cherokee, Lake | 40,094 | 36,301 | 90.5 | 2,996 | 7.5 | -541 | -1.3 |
| Choke Canyon Reservoir | 662,820 | 214,629 | 32.4 | -4,060 | 0.0 | -80,323 | -12.1 |
| *Cisco, Lake | 29,003 | 20,869 | 72.0 | -146 | 0.0 | -4,750 | -16.4 |
| Coleman, Lake | 38,075 | 28,282 | 74.3 | -111 | 0.0 | -7,928 | -20.8 |
| Colorado City, Lake | 31,040 | 25,886 | 83.4 | -92 | 0.0 | -5,154 | -16.6 |
| *Coletto Creek Reservoir | 30,758 | 17,389 | 56.5 | -253 | 0.0 | -5,817 | -18.9 |
| Conroe, Lake | 417,577 | 372,501 | 89.2 | 2,050 | 0.5 | -21,978 | -5.3 |
| Corpus Christi, Lake | 256,062 | 200,743 | 78.4 | -1,983 | 0.0 | -8,895 | -3.5 |
| Crook, Lake | 9,195 | 9,185 | 99.9 | 1,377 | 15.0 | 1,104 | 12.0 |
| Cypress Springs, Lake | 66,756 | 62,395 | 93.5 | 3,225 | 4.8 | -31 | 0.0 |
| E. V. Spence Reservoir | 517,272 | 97,300 | 18.8 | -1,234 | 0.0 | -34,048 | -6.6 |
| Eagle Mountain Lake | 179,880 | 142,692 | 79.3 | 3,396 | 1.9 | -24,015 | -13.4 |
| Elephant Butte Reservoir (Texas) | 852,491 | 76,901 | 9.0 | 16,575 | 1.9 | 18,685 | 2.2 |
| Elephant Butte Reservoir (Total Storage) | 1,985,900 | 178,011 | 9.0 | 38,367 | 1.9 | 43,253 | 2.2 |
| *Falcon Reservoir (Texas & Mexico) | 2,646,817 | 480,948 | 18.2 | 2,701 | 0.1 | 63,234 | 2.4 |
| *Falcon Reservoir (Texas) | 1,551,007 | 219,041 | 14.1 | -4,763 | 0.0 | -115,904 | -7.5 |
| Fork Reservoir, Lake | 605,061 | 464,364 | 76.7 | 22,841 | 3.8 | -68,775 | -11.4 |
| Fort Phantom Hill, Lake | 70,030 | 47,792 | 68.2 | -121 | 0.0 | -19,036 | -27.2 |
| Georgetown, Lake | 38,005 | 19,941 | 52.5 | 902 | 2.4 | -7,397 | -19.5 |
| Gibbons Creek Reservoir | 25,721 | 18,827 | 73.2 | 901 | 3.5 | -2,361 | -9.2 |
| Graham, Lake | 45,288 | 35,675 | 78.8 | -483 | -1.1 | -4,219 | -9.3 |
| Granbury, Lake | 132,949 | 115,045 | 86.5 | 147 | 0.1 | -13,624 | -10.2 |

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

| Name of lake or reservoir | Storage capacity | Storage at end-November 2022 | | Storage change from end-Oct 2022 | | Storage change from end-Nov 2021 | | |
|------------------------------------|------------------|------------------------------|-------|----------------------------------|------|----------------------------------|-------|--|
| | (acre-feet) | (acre-feet) | (%) | (acre-feet) | (%) | (acre-feet)** | (%) | |
| <i>Continued</i> | | | | | | | | |
| Granger Lake | 51,822 | 47,981 | 92.6 | 4,588 | 8.9 | -3,841 | -7.4 | |
| Grapevine Lake | 163,064 | 163,064 | 100.0 | 0 | 0.0 | 6,602 | 4.0 | |
| Greenbelt Lake | 59,968 | 7,224 | 12.0 | -220 | 0.0 | -2,790 | -4.7 | |
| *Halbert, Lake | 6,033 | 5,439 | 90.2 | 773 | 12.8 | 268 | 4.4 | |
| Hords Creek Lake | 8,109 | 2,510 | 31.0 | -4 | 0.0 | -1,061 | -13.1 | |
| Houston County Lake | 17,113 | 15,102 | 88.2 | 856 | 5.0 | -2,011 | -11.8 | |
| Houston, Lake | 132,318 | 130,379 | 98.5 | -1,596 | -1.2 | -1,939 | -1.5 | |
| Hubbard Creek Reservoir | 313,298 | 214,185 | 68.4 | -3,429 | -1.1 | -67,985 | -21.7 | |
| Hubert H Moss Lake | 24,058 | 21,312 | 88.6 | -31 | 0.0 | -1,509 | -6.3 | |
| Inks, Lake | 13,729 | 13,052 | 95.1 | -8 | 0.0 | -127 | 0.0 | |
| J. B. Thomas, Lake | 199,931 | 50,083 | 25.1 | -1,886 | 0.0 | -32,320 | -16.2 | |
| Jacksonville, Lake | 25,670 | 23,498 | 91.5 | 385 | 1.5 | -1,883 | -7.3 | |
| Jim Chapman Lake (Cooper) | 260,332 | 206,656 | 79.4 | 37,208 | 14.3 | -9,813 | -3.8 | |
| Joe Pool Lake | 175,800 | 175,800 | 100.0 | 8,748 | 5.0 | 6,716 | 3.8 | |
| Kemp, Lake | 245,307 | 132,617 | 54.1 | 2,393 | 1.0 | -77,546 | -31.6 | |
| Kickapoo, Lake | 86,345 | 51,166 | 59.3 | -776 | 0.0 | -15,592 | -18.1 | |
| Lavon Lake | 409,757 | 344,265 | 84.0 | 51,174 | 12.5 | 5,378 | 1.3 | |
| Leon, Lake | 27,762 | 16,924 | 61.0 | -25 | 0.0 | -7,918 | -28.5 | |
| Lewisville Lake | 563,228 | 479,319 | 85.1 | 33,461 | 5.9 | -45,710 | -8.1 | |
| Limestone, Lake | 203,780 | 143,415 | 70.4 | 513 | 0.3 | -38,228 | -18.8 | |
| *Livingston, Lake | 1,603,504 | 1,603,504 | 100.0 | 83,528 | 5.2 | 4,657 | 0.3 | |
| *Lost Creek Reservoir | 11,950 | 10,494 | 87.8 | -57 | 0.0 | -1,183 | -9.9 | |
| Lyndon B Johnson, Lake | 112,778 | 111,365 | 98.7 | 0 | 0.0 | 192 | 0.2 | |
| Mackenzie Reservoir | 46,450 | 2,913 | 6.3 | -36 | 0.0 | -708 | -1.5 | |
| Marble Falls, Lake | 7,597 | 4,455 | 58.6 | 42 | 0.6 | -2,790 | -36.7 | |
| Martin, Lake | 75,726 | 59,028 | 77.9 | 1,026 | 1.4 | -6,194 | -8.2 | |
| Medina Lake | 254,823 | 17,061 | 6.7 | -839 | 0.0 | -50,969 | -20.0 | |
| Meredith, Lake | 500,000 | 154,713 | 30.9 | -2,565 | 0.0 | -20,593 | -4.1 | |
| Millers Creek Reservoir | 26,768 | 16,781 | 62.7 | -296 | -1.1 | -6,946 | -25.9 | |
| *Mineral Wells, Lake | 5,273 | 4,190 | 79.5 | 5 | 0.1 | -1,004 | -19.0 | |
| Monticello, Lake | 34,740 | 27,532 | 79.3 | 795 | 2.3 | 828 | 2.4 | |
| Mountain Creek, Lake | 22,850 | 22,850 | 100.0 | 0 | 0.0 | 0 | 0.0 | |
| Murvaul, Lake | 38,285 | 38,285 | 100.0 | 2,240 | 5.9 | 1,937 | 5.1 | |
| Nacogdoches, Lake | 39,522 | 31,303 | 79.2 | -147 | 0.0 | -3,594 | -9.1 | |
| Nasworthy | 9,615 | 8,343 | 86.8 | 147 | 1.5 | 270 | 2.8 | |
| Navarro Mills Lake | 49,827 | 37,143 | 74.5 | 2,322 | 4.7 | -7,806 | -15.7 | |
| New Terrell City Lake | 8,583 | 8,454 | 98.5 | 1,617 | 18.8 | 643 | 7.5 | |
| Nocona, Lake (Farmers Crk) | 21,444 | 16,233 | 75.7 | -130 | 0.0 | -3,074 | -14.3 | |
| North Fork Buffalo Creek Reservoir | 15,400 | 6,830 | 44.4 | -248 | -1.6 | -5,877 | -38.2 | |
| O' the Pines, Lake | 241,363 | 239,427 | 99.2 | 11,611 | 4.8 | 3,324 | 1.4 | |
| O. C. Fisher Lake | 115,742 | 3,741 | 3.2 | -49 | 0.0 | -3,540 | -3.1 | |
| *O. H. Ivie Reservoir | 554,340 | 222,089 | 40.1 | -407 | 0.0 | -84,086 | -15.2 | |
| Oak Creek Reservoir | 39,210 | 19,358 | 49.4 | -282 | 0.0 | -8,105 | -20.7 | |

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

| Name of lake or reservoir | Storage capacity | Storage at end-November 2022 | | Storage change from end-Oct 2022 | | Storage change from end-Nov 2021 | |
|---|-------------------|------------------------------|-------------|----------------------------------|------------|----------------------------------|-------------|
| | (acre-feet) | (acre-feet) | (%) | (acre-feet) | (%) | (acre-feet)** | (%) |
| <i>Continued</i> | | | | | | | |
| Palestine, Lake | 367,303 | 323,295 | 88.0 | 11,602 | 3.2 | -28,950 | -7.9 |
| Palo Duro Reservoir | 61,066 | 275 | 0.5 | 1 | 0.0 | -197 | 0.0 |
| Palo Pinto, Lake | 26,766 | 15,291 | 57.1 | -192 | 0.0 | -10,997 | -41.1 |
| Pat Cleburne, Lake | 26,008 | 14,399 | 55.4 | 856 | 3.3 | -6,707 | -25.8 |
| *Pat Mayse Lake | 113,683 | 109,652 | 96.5 | 8,907 | 7.8 | 5,712 | 5.0 |
| Possum Kingdom Lake | 538,139 | 441,584 | 82.1 | -3,103 | 0.0 | -79,745 | -14.8 |
| Proctor Lake | 54,762 | 23,798 | 43.5 | -459 | 0.0 | -24,404 | -44.6 |
| Ray Hubbard, Lake | 439,559 | 429,431 | 97.7 | 39,468 | 9.0 | 12,173 | 2.8 |
| Ray Roberts, Lake | 788,167 | 742,780 | 94.2 | 17,662 | 2.2 | -28,207 | -3.6 |
| Red Bluff Reservoir | 151,110 | 93,598 | 61.9 | 1,461 | 1.0 | -16,972 | -11.2 |
| Richland-Chambers Reservoir | 1,087,839 | 901,006 | 82.8 | 33,039 | 3.0 | -100,325 | -9.2 |
| Sam Rayburn Reservoir | 2,857,077 | 2,198,193 | 76.9 | -5,763 | 0.0 | -302,594 | -10.6 |
| Somerville Lake | 150,293 | 96,131 | 64.0 | no data | | -54,162 | -36.0 |
| Squaw Creek, Lake | 151,250 | 151,250 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| Stamford, Lake | 51,570 | 33,138 | 64.3 | -442 | 0.0 | -13,126 | -25.5 |
| Stillhouse Hollow Lake | 229,796 | 169,351 | 73.7 | 1,949 | 0.8 | -51,646 | -22.5 |
| Striker, Lake | 16,934 | 15,925 | 94.0 | 1,658 | 9.8 | -1,009 | -6.0 |
| Sweetwater, Lake | 12,267 | 7,480 | 61.0 | -109 | 0.0 | -2,432 | -19.8 |
| *Sulphur Springs, Lake | 17,747 | 17,747 | 100.0 | 5,378 | 30.3 | 6,987 | 39.4 |
| Tawakoni, Lake | 871,685 | 810,995 | 93.0 | 74,700 | 8.6 | 1,414 | 0.2 |
| Texana, Lake | 158,975 | 121,774 | 76.6 | 12,191 | 7.7 | -36,073 | -22.7 |
| Texoma, Lake (Texas & Oklahoma) | 2,487,601 | 2,381,587 | 95.7 | 68,349 | 2.7 | -717 | 0 |
| Texoma, Lake (Texas) | 1,243,801 | 1,190,793 | 95.7 | 34,175 | 2.7 | -359 | 0.0 |
| Toledo Bend Reservoir (Texas & Louisiana) | 4,472,900 | 3,820,946 | 85.4 | 133,559 | 3.0 | 57,809 | 1.3 |
| Toledo Bend Reservoir (Texas) | 2,236,450 | 1,908,423 | 85.3 | 66,779 | 3.0 | 28,905 | 1.3 |
| Travis, Lake | 1,098,044 | 509,449 | 46.4 | 2,460 | 0.2 | -275,446 | -25.1 |
| Twin Buttes Reservoir | 182,454 | 52,842 | 29.0 | -572 | 0.0 | -42,116 | -23.1 |
| Tyler, Lake | 72,073 | 59,711 | 82.8 | 1,124 | 1.6 | -9,254 | -12.8 |
| Waco, Lake | 189,418 | 109,161 | 57.6 | 1,113 | 0.6 | -62,337 | -32.9 |
| Waxahachie, Lake | 11,060 | 9,392 | 84.9 | 976 | 8.8 | 221 | 2.0 |
| Weatherford, Lake | 17,812 | 11,044 | 62.0 | -44 | 0.0 | -4,051 | -22.7 |
| White River Lake | 29,880 | 4,340 | 14.5 | -111 | 0.0 | -1,736 | -5.8 |
| Whitney, Lake | 564,808 | 423,138 | 74.9 | 12,574 | 2.2 | -93,853 | -16.6 |
| Worth, Lake | 24,419 | 16,916 | 69.3 | -569 | -2.3 | -3,640 | -14.9 |
| Wright Patman Lake | 122,593 | 122,593 | 100.0 | -12,476 | -10.2 | 0 | 0.0 |
| STATEWIDE TOTAL | | | | | | | |
| STATEWIDE TOTAL | 32,414,434 | 22,114,948 | 68.2 | 681,592 | 2.1 | -2,802,220 | -8.6 |

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

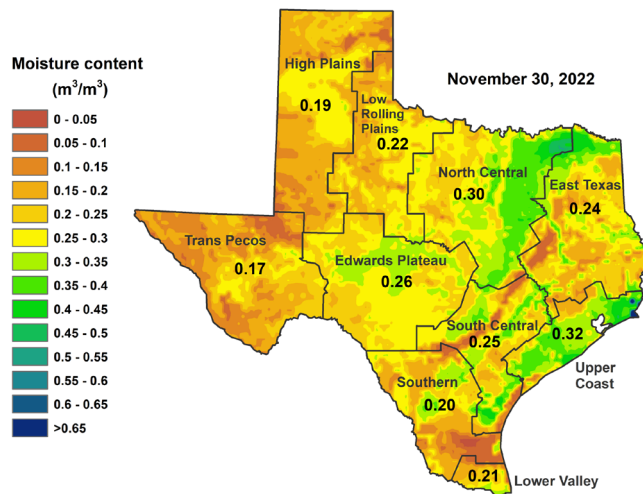
**Monthly and yearly changes do not include reservoirs that did not have data in the last month or last year, respectively.

SOIL MOISTURE

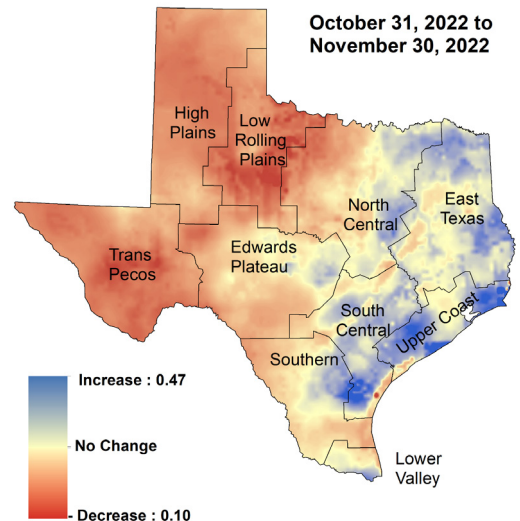
At the end of November 2022, root zone soil moisture was below average [< 0.3 cubic meters of water per bulk cubic meter soil (m^3/m^3), Figure 5(a)] across most of the state. Average soil moisture [0.3 cubic meters of water per bulk cubic meter soil (m^3/m^3), Figure 5(a)] was seen in the northern Edwards Plateau, eastern North Central, portions of East Texas, northern Southern, southern Lower Valley, portions of the South Central, and much of the Upper Coast climate divisions. Low soil moisture [< 0.15 cubic meters of water per bulk cubic meter soil (m^3/m^3), Figure 5(a)] was seen in the northern and southern High Plains, western and central Low Rolling Plains, much of the Trans Pecos, western North Central, portions of East Texas, northern and southern South Central, much of the Southern, northern Lower Valley, and areas of the Upper Coast climate divisions. Above average soil moisture [> 0.3 cubic meters of water per bulk cubic meter soil (m^3/m^3), Figure 5(a)] was seen in northeastern North Central and eastern Upper Coast climate divisions.

Compared to conditions at the end of October 2022, soil moisture content increased [blue shading in Figure 5(b)] with a maximum of $0.47 \text{ m}^3/\text{m}^3$ in eastern North Central, portions of East Texas, eastern Edwards Plateau, eastern Southern, southern Lower Valley, much of the South Central, and Upper Coast climate divisions. Soil moisture content decreased [red shading in Figure 5(b)] in the High Plains, Low Rolling Plains, Trans Pecos, much of the Edwards Plateau, western and central North Central, western and central East Texas, much of the Southern, Lower Valley, southwestern Upper Coast, and northern and southern South Central climate divisions.

a)



b)



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 5: (a) Root zone soil moisture conditions in November 2022 and (b) the difference in root zone soil moisture between end-October 2022 and end-November 2022

STREAMFLOW CONDITIONS

Normal streamflow (25–75th percentile, green shading, Figure 6) was recorded in northern, western, and portions of central and eastern Texas this month. Above normal (76–90th percentile, light blue shading, Figure 6) streamflow was seen in the Upper Brazos (Running Water Draw watershed), the Upper Trinity (Lower West Fork Trinity, Cedar, and Richland watersheds), Colorado (Brady watershed), Colorado-Lavaca, San Jacinto (Buffalo-San Jacinto watershed), and San Jacinto-Brazos river basins. Much above normal (>90th percentile, dark blue shading, Figure 6) was seen in the Nueces-Rio Grande river basin (San Fernando watershed).

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

Much below normal stream flow (< 10th percentile, dark red shading, Figure 6) was seen in the Upper Red (Washita Headwaters, and Lower Salt Fork Red watersheds), Colorado (North Llano, and Pedernales watersheds), Guadalupe, Upper and Middle Guadalupe, Nueces (Upper Frio watershed) river basins.

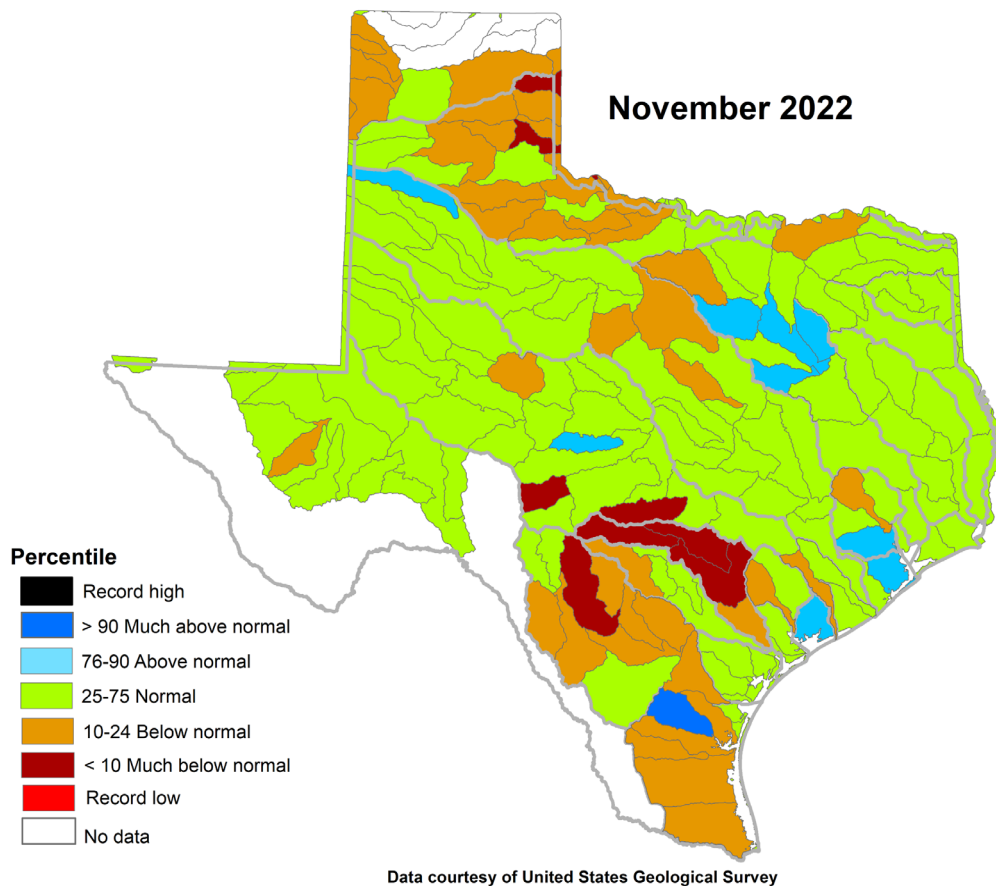
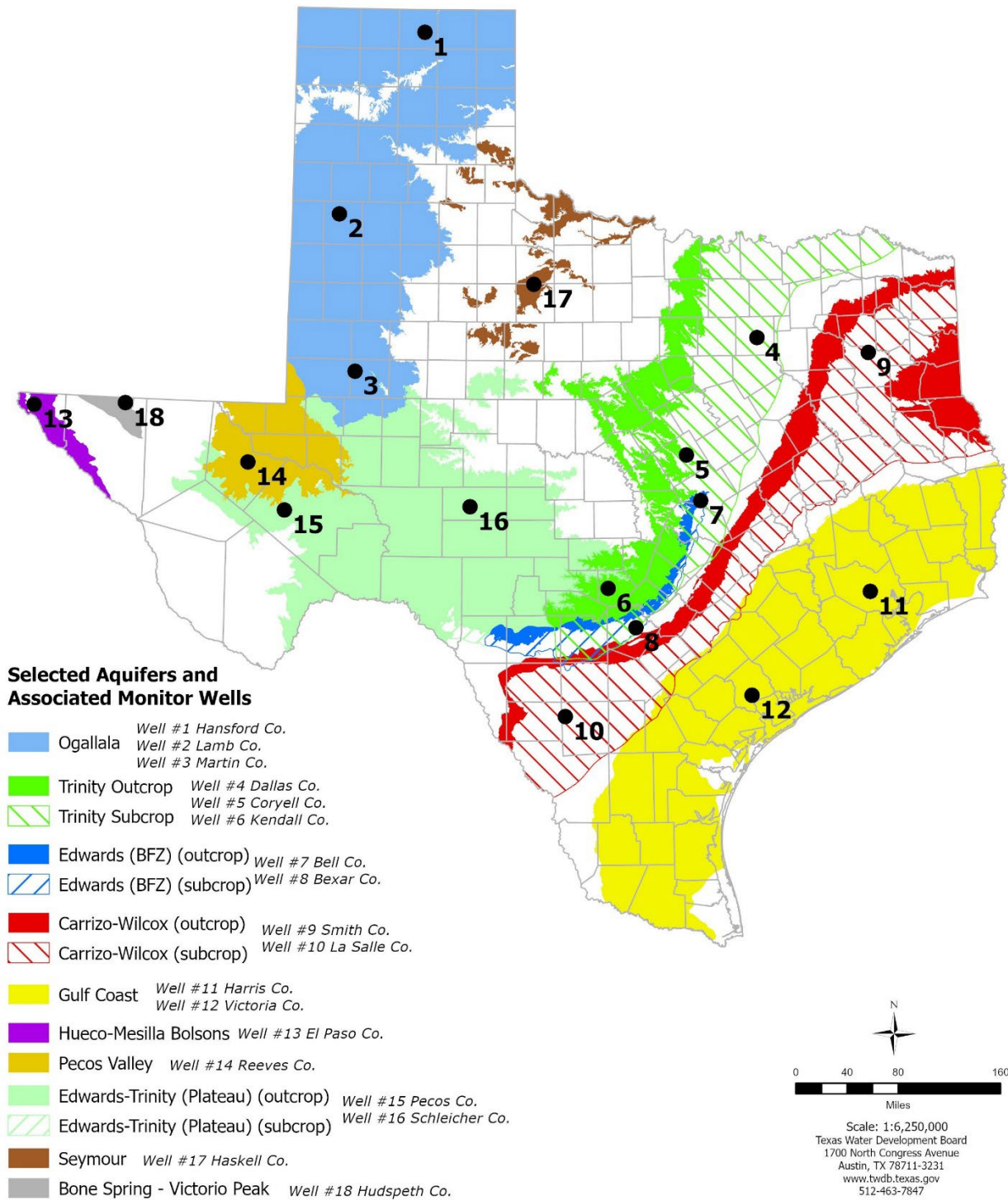


Figure 6: Runoff percentiles by the U.S. Geological Survey's Hydrologic Unit Code



NOVEMBER 2022 GROUNDWATER LEVELS IN MONITORING WELLS

Water-level measurements were available for 17 key monitoring wells in the state. The recorder in one well (#15 on map) was offline during the reporting period. Water levels rose in 11 monitoring wells since the beginning of November, ranging from an increase of 0.42 feet in the Haskell County Seymour Aquifer well (#17 on map) to 9.34 feet in the La Salle County Carrizo-Wilcox Aquifer well (#10 on map). Water levels declined in six monitoring wells, ranging from a decline of -0.07 feet in the Martin County Ogallala Aquifer well (#3 on map) to -3.65 feet in the Dallas County Trinity Aquifer well (#4 on map). The J-17 well (#8 on map) in San Antonio recorded a water level of 92.90 feet below land surface or 638.10 feet above mean sea level. Water levels are 1.90 feet below the Stage 3 critical management level for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer. Stage 3 water restrictions have been in effect since June 13, 2022.

* Well numbers used in this publication on the aquifer map to indicate the monitoring well location (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 | 162.97 | 162.66 | -0.31 | NA | -92.85 | 1951 |
| (2) Lamb 1053602 | 153.38 | 153.28 | -0.10 | -0.98 | -125.21 | 1951 |
| (3) Martin 2739903 | 145.88 | 145.81 | -0.07 | -1.43 | -40.99 | 1964 |
| (4) Dallas 3319101 | 515.84 | 512.19 | -3.65 | -20.31 | -293.84 | 1954 |
| (5) Coryell 4035404 | 546.05 | 551.65 | 5.60 | -13.08 | -254.05 | 1955** |
| (6) Kendall 6802609 | 167.99 | 168.59 | 0.60 | -18.98 | -107.99 | 1975 |
| (7) Bell 5804816 | 125.41 | 126.83 | 1.42 | -3.50 | -1.90 | 2008 |
| (8) Bexar 6837203 | 92.90 | 96.90 | 4.00 | -27.60 | -46.26 | 1932 |
| (9) Smith 3430907 | 443.05 | 443.79 | 0.74 | -2.87 | -143.05 | 1977** |
| (10) La Salle 7738103 | 530.27 | 539.61 | 9.34 | -26.54 | -277.20 | 2003 |
| (11) Harris 6514409 | 193.92 | 193.60 | -0.32 | -7.64 | -58.42 | 1947** |
| (12) Victoria 8017502 | 33.97 | 34.47 | 0.50 | -2.55 | 0.03 | 1958** |
| (13) El Paso 4913301 | 300.05 | 300.51 | 0.46 | -1.24 | -68.15 | 1964** |
| (14) Reeves 4644501 | 157.68 | 157.54 | -0.14 | NA | -65.59 | 1952 |
| (15) Pecos 5216802 | NA | NA | NA | NA | 29.82* | 1976 |
| (16) Schleicher 5512134 | 311.70 | 314.09 | 2.39 | -9.48 | -9.80 | 2003 |
| (17) Haskell 2135748 | 46.83 | 47.25 | 0.42 | -1.52 | -3.83 | 2002 |
| (18) Hudspeth 4807516 | 152.60 | 153.99 | 1.39 | NA | -48.68 | 1966 |

* Change since the original measurement taken on the date indicated in the last column. The historical change shown for recorder well #15 is based off the most recent water level record from September 2022.

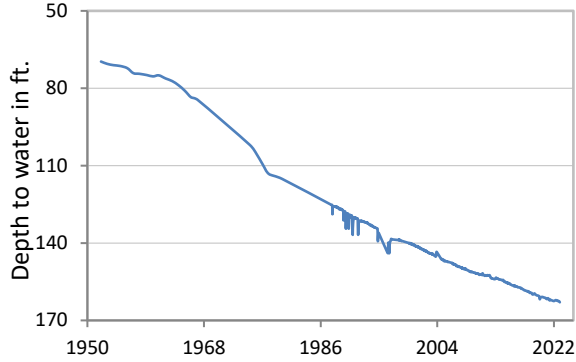
** Measurement not shown on the hydrograph.

NA (not available)

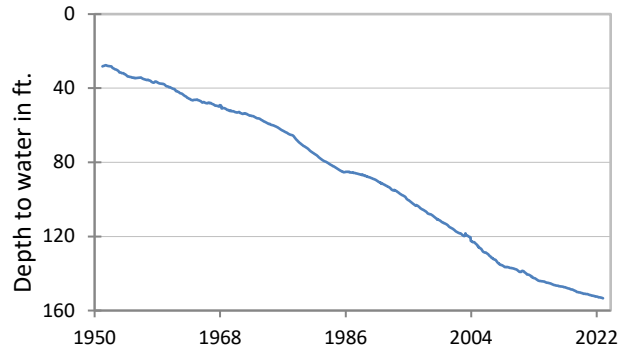
All data are provisional and subject to revision

NOVEMBER 2022 MONITORING WELL HYDROGRAPHS

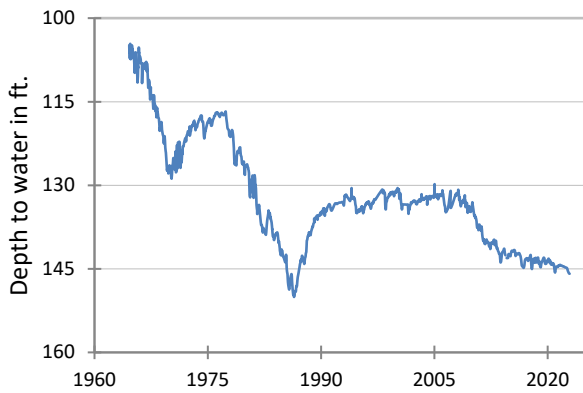
**(1) State Well #03-54-301
Near Spearman, Hansford County
Ogallala Aquifer**



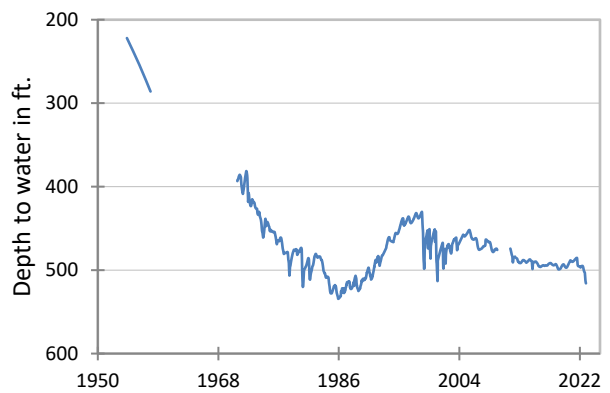
**(2) State Well #10-53-602
Near Earth, Lamb County
Ogallala Aquifer**



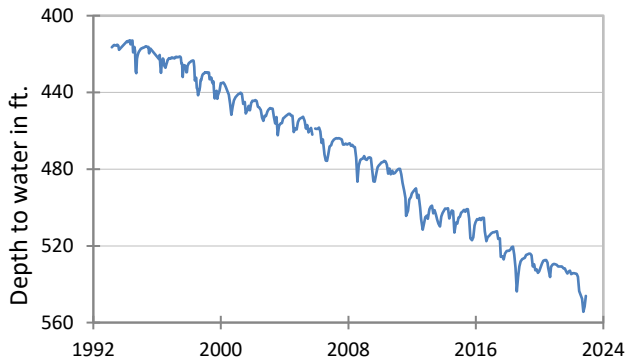
**(3) State Well #27-39-903
Northwest Martin County
Ogallala Aquifer**



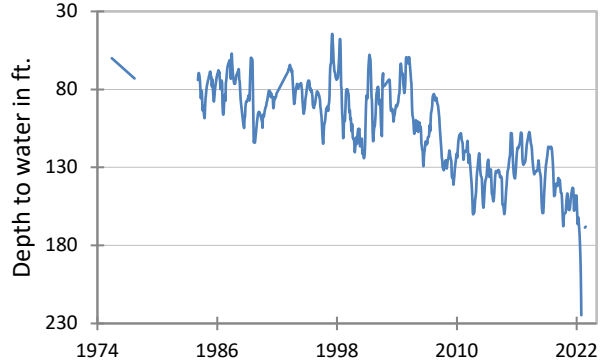
**(4) State Well #33-19-101
Southeast Dallas, Dallas County
Twin Mountains Formation-Trinity Aquifer**



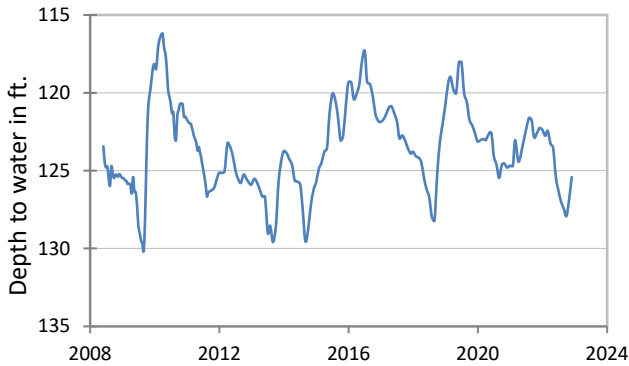
**(5) State Well #40-35-404
Gatesville, Coryell County
Hosston Formation-Trinity Aquifer**



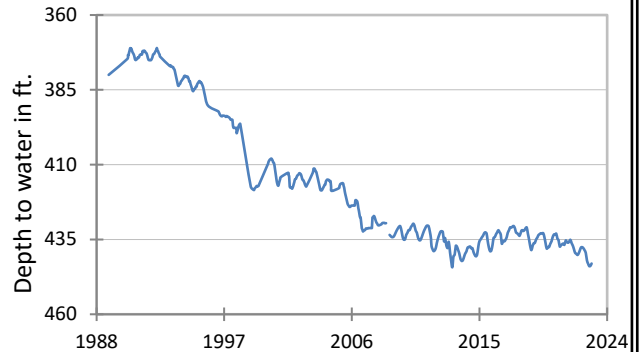
**(6) State Well #68-02-609
Waring, Kendall County
Travis Peak Formation-Trinity Aquifer**



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



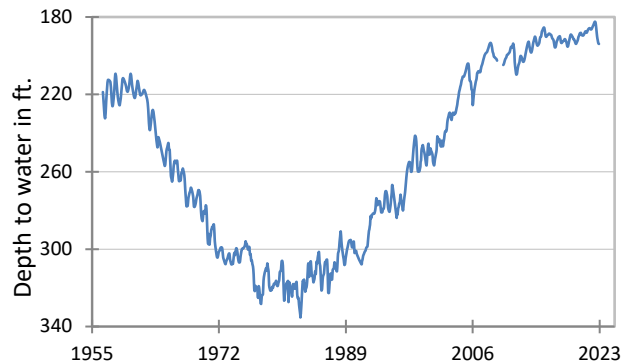
**(9) State Well #34-30-907
Red Springs, Smith County
Carrizo-Wilcox Aquifer**



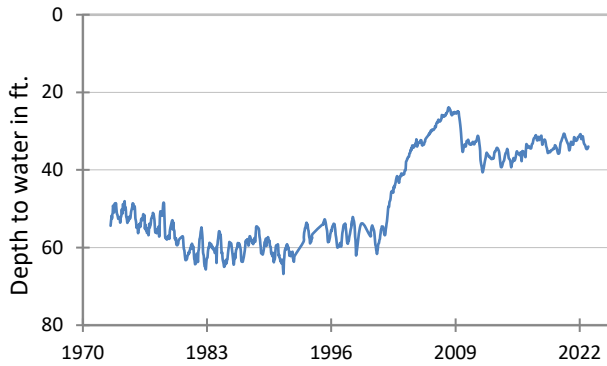
**(10) State Well #77-38-103
Near Cotulla, La Salle County
Carrizo-Wilcox Aquifer**



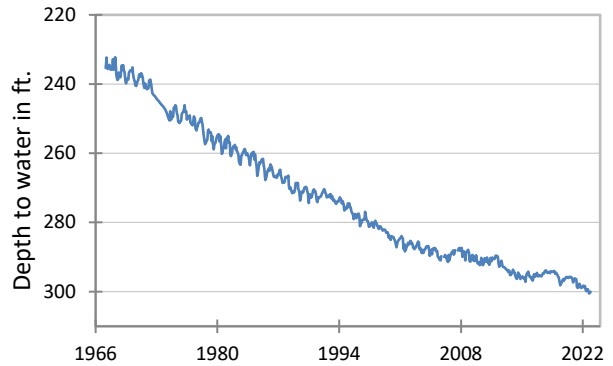
**(11) State Well #65-14-409
North Houston, Harris County
Evangeline Formation-Gulf Coast Aquifer**



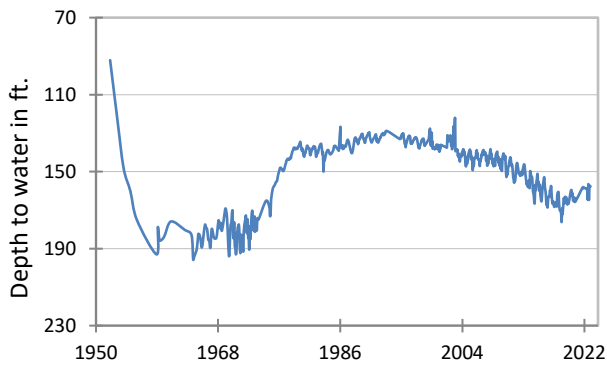
(12) State Well #80-17-502
Near Bloomington, Victoria County
Lissie Formation-Gulf Coast Aquifer



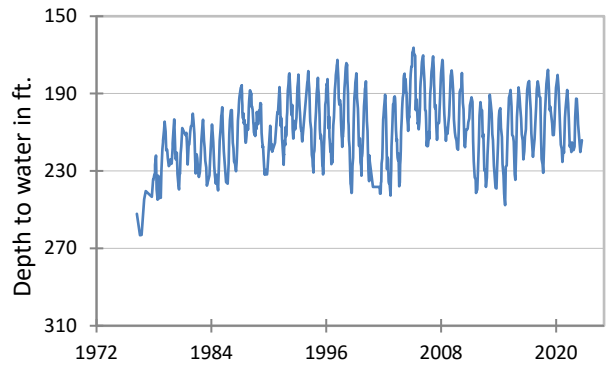
(13) State Well #49-13-301
El Paso, El Paso County
Hueco-Mesilla Bolsons Aquifer



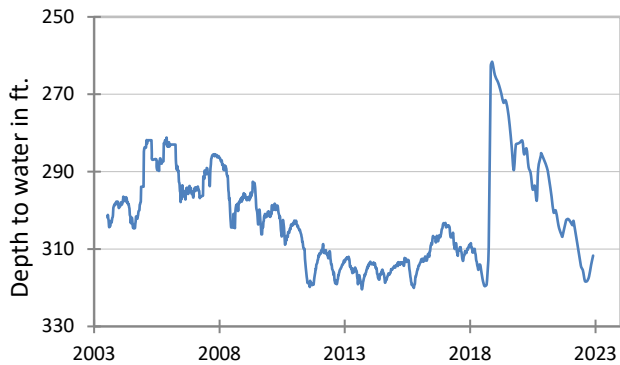
(14) State Well #46-44-501
Near Pecos, Reeves County
Pecos Valley Aquifer



*** (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

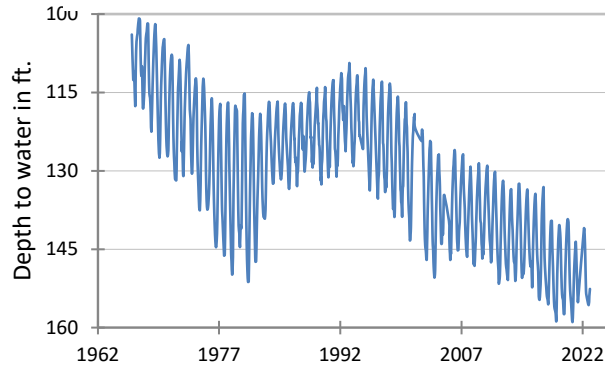


(17) State Well #21-35-748
Near O'Brien, Haskell County
Seymour Aquifer

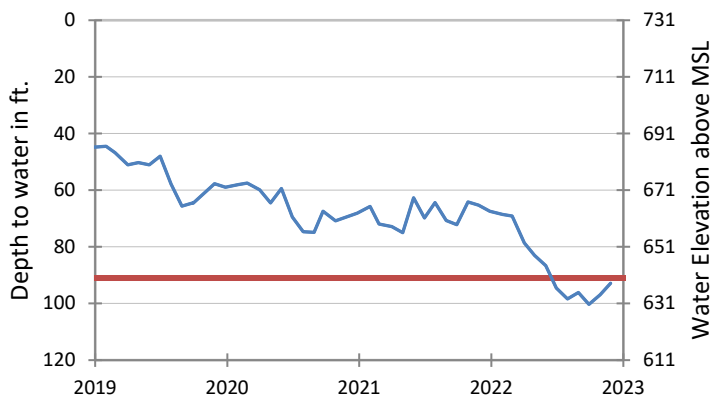
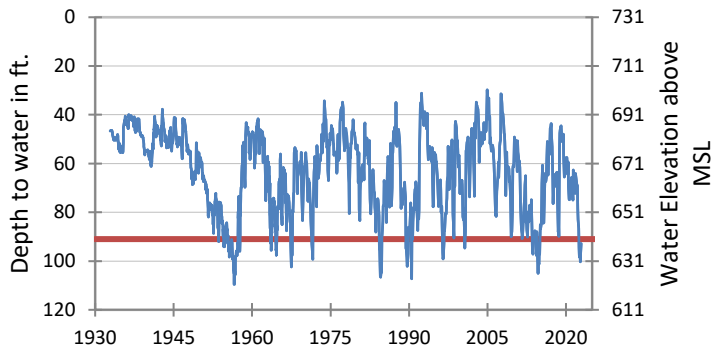


*Recorder well #15 was offline in November 2022 and did not record data.

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



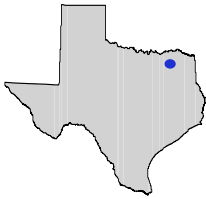
**(8) State Well #68-37-203 (J-17)
San Antonio, Bexar County
Edwards (Balcones Fault Zone) Aquifer**



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 92.90 feet below land surface, or 638.10 feet above mean sea level. This was 4.00 feet above last month's measurement, 27.60 feet below last year's measurement, and 46.26 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. In November 2022, Stage 3 drought restrictions were in effect because the aquifer remained below the Stage 3 critical management level.

HYDROGRAPH OF THE MONTH

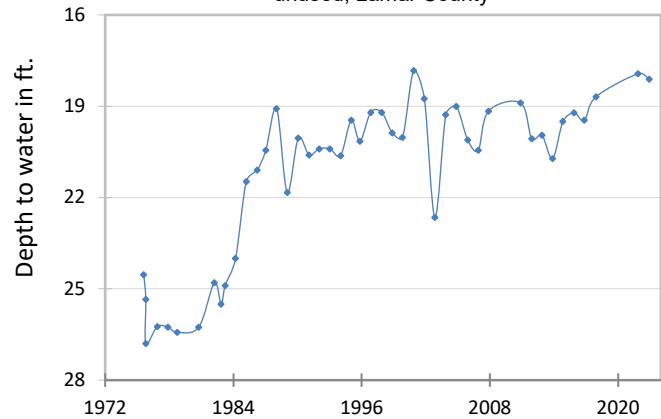


Each month this space features a new hydrograph (marked with the • symbol on the map) depicting different aquifers and their conditions in Texas.

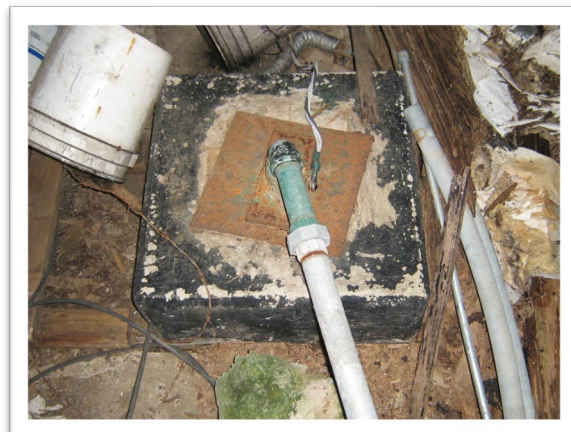
The Blossom Aquifer is a minor aquifer located in Bowie, Red River, and Lamar counties in the northeast corner of Texas. The aquifer consists of the Blossom Sand Formation, composed of alternating sequences of sand and clay. In places, the aquifer is as much as 400 feet thick, although no more than about one-third of this thickness consists of sand, and freshwater saturated thickness averages 25 feet. The aquifer yields water of usable quality to wells located mostly in outcrop areas. However, in part of Red River County, slightly saline water, with total dissolved solids less than 3,000 milligrams per liter, extends underground for about 6 miles south of the outcrop. Groundwater in the Blossom Aquifer is generally soft, slightly alkaline, and, in some areas, high in sodium, bicarbonate, iron, and fluoride. Although water quality is not acceptable for irrigation, it is generally acceptable for nonindustrial uses. Municipal pumping accounts for a large percentage of total pumpage from the aquifer. Clarksville and the Red River County Water Supply Corporation in Red River County have historically pumped the greatest amounts from the aquifer, causing water level declines. In recent years, however, the rate of decline has slowed or even stabilized in some wells as a result of more surface water use in the area.

Blossom Aquifer

Well #17-28-710, 168 feet deep
unused, Lamar County



The initial measurement taken by the TWDB in this former public water supply well was 24.53 feet below land surface in August 1975. The TWDB continues to collect near-annual measurements in this now unused well. The period of record reveals a distinct rise in water level from 1975 to 1988, which may be explained by the change in use of the well. Since 1988, water levels have experienced annual fluctuations of up to 3.9 feet per year, largely remaining between 19 and 22 feet below land surface. More recently, water levels have been slowly trending upwards at a rate of 0.07 feet per year.



Far away (left), and close-up (right) images of well #17-21-710.